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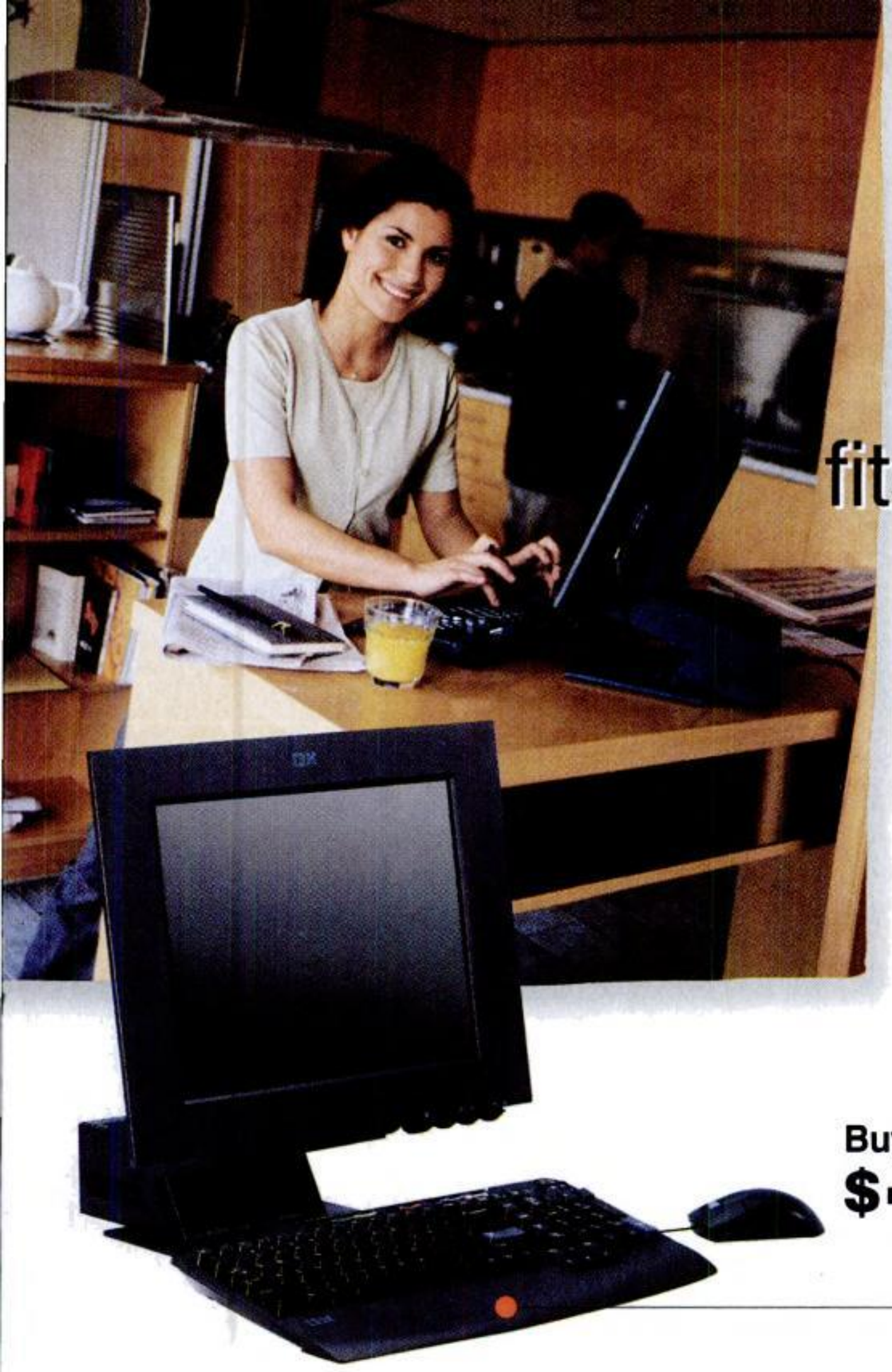

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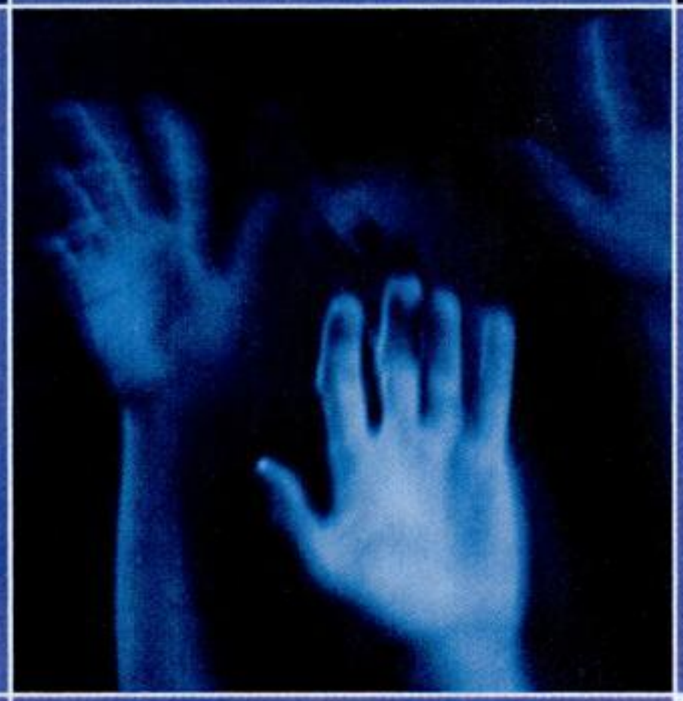

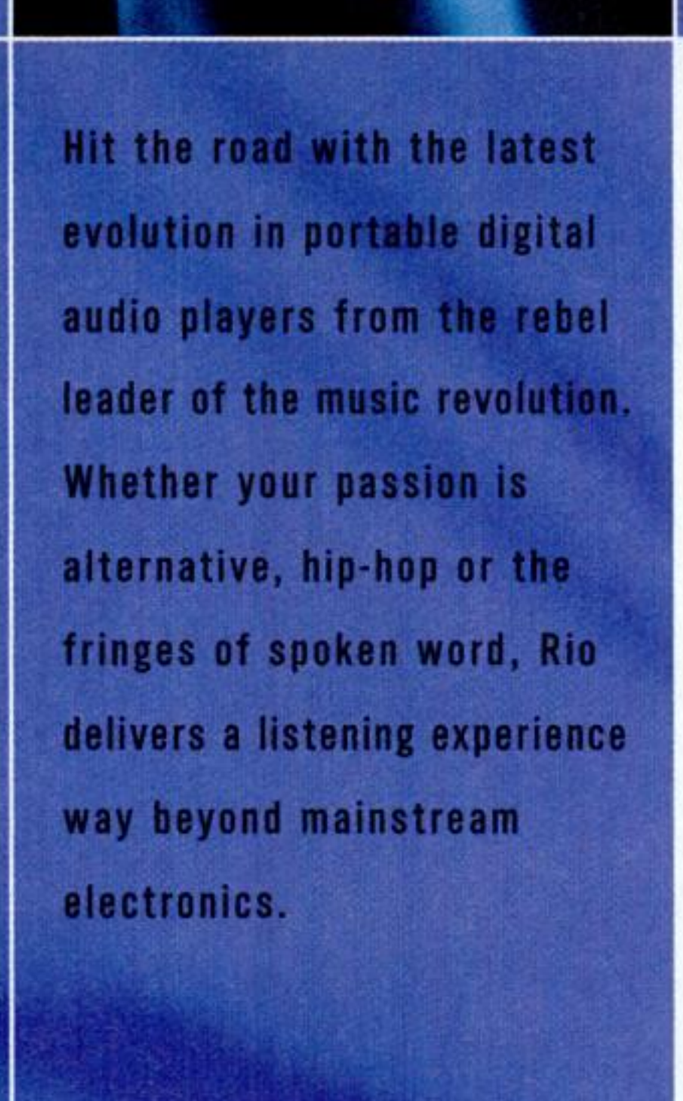

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We Won!

Presenting a cogent, easy-to-follow how-to article is always a difficult task, but it appears that we really nailed it with our Dream Machine 99 "Build It" feature—or so believes the Computer Press Association. This month, we received notice from the CPA that the "Build It" feature won an award for Best Print How-to Article, beating runners-up from *PC World* and *PC Computing*. One judge commented, "'Build It', a step-by-step instruction on how to build a PC with clear, useful, and numerous illustrations, is a standout example of the genre... Makes me want to build my own box."

Awesome! We wanted the "Build It" feature to inspire first-time system builders, and judging by that comment—not to mention all the mail we received after the article ran—it looks like we achieved our goal. This year, Dream Machine 2000 takes a decidedly different approach. Be sure to put on your eye protection when you turn to page 30.

What's Up With the Smacking of Downs?

Hey, wait a minute: Your August 2000 issue has "Videocard Smackdown" on the front cover despite a ban of that phrase in the July 2000 Glitch. So what is this, blatant disregard for the commands of the editor-in-chief? And on the front cover, no less! I'll tell you what it is: It's a big, lumpy bowl of crapioca pudding!

—Nate Leavitt

Editor-in-Chief Jon Phillips replies: Those insubordinate, mutinous wretches! Despite being banned from using the colloquialism "smackdown" in product critiques, my wily charges snuck the phrase into the magazine anyway—all while I was out of the office, far removed from the front lines of cover composition. Trust me, Nate, a special prosecutor is already working on court-martial arguments. Justice will be served!

I'll tell you what it is: It's a big, lumpy bowl of crapioca pudding!

Voodoo5: Is It Really AGP?

In the "Videocard Smackdown" article, a statement is made to the effect that the Voodoo5 5500 AGP does not take advantage of AGP in even a rudimentary form. The reasons given for this are that a single Voodoo5 is considered "multiple devices" and that it "can only move data at PCI speeds." This is not entirely true. The card is recognized as a single device by the operating system (in Device Manager) and in hardware (it requires only one IRQ). The VSA-100 chips on the card are not individually addressed by the computer. The SLI configuration is transparent.

Also, the Voodoo5 5500 is AGP compliant with respect to the fact that it uses sidebanding, just as the Voodoo3 uses AGP 2x sidebanding. Even if the Voodoo5 5500 didn't take advantage of AGP sidebanding, the card would still be forced to operate at 66MHz—that's 33MHz above PCI speeds. Now, it is true that the Voodoo5, like its predecessor, can't draw textures directly from main memory across the AGP bus, but, in effect, the Voodoo5 5500 does indeed have basic support for AGP. It is not a "PCI part pretending to be an AGP part," but an AGP part that doesn't fully take advantage of the AGP functions offered it.

—Cal Morton, Jr

Features Editor Sean Downey replies: Your letter throws new fuel on a continuing debate, so we decided to publish the original explanation we received from 3dfx:

"The AGP protocol doesn't support multiple devices. For this reason, the Voodoo5 5500 AGP (Dual VSA-100 chips) is designed to run as a single multi-function device. Because of the AGP protocol limitation, the 5500 AGP will run in the PCI-66 mode in an AGP slot. Even though AGP 2x has twice the bandwidth as PCI-66, there is only a minor performance hit (less than 1 percent) when comparing PCI-66 to AGP 2x in high-resolution games such as *Quake III* at 1600x1200x32-bit. This means that the Voodoo5 5500 AGP is not bus limited, and running at PCI-66 is a non-issue."

Now, what many people find confusing about the Voodoo5 is that it reports itself as an AGP 2x videocard with sidebanding support. We think that when software utilities such as *Powerstrip* query the hardware for enabled features and AGP capabilities, the card should give an accurate report of what it can and can't do—and the Voodoo5 can't do AGP 2x with sidebanding. When we wrote that the Voodoo5 was pretending to be an AGP part, we were referring to this "misreportage" in *Powerstrip*.

Color Us Corrected

I'm a member of the Imaging Science Foundation, and do many video color temperature calibrations on all types of display monitors. Your June issue explanation of color temperature is semi-correct. On a properly set-up monitor, d6500 Kelvin would give

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you "true white." Going up in temperature from that point would add blue, and going down would subtract blue from the picture. When you subtract blue you get yellow. Not red. Color temperature is used to make sure that the signal media you're getting is truly displayed on whatever device it is that you're using. d6500 is the color of sunlight. This is why NTSC monitors and most computer monitors need to be set there. This will reduce CRT burnout and eyestrain when viewed. Many people like brighter displays, and since the eye sees excess blue as "brighter," many people like the 9000 degree range. This also helps when surrounded by high ambient light. In closing, if your monitor turns reddish when you turn down your color temp, you need a calibration.

—Brett Barnes

LCDs suffer from severe artifacting when not running at their native resolution, which is typically 1024x768.

Psygnosis Signs Off

Whatever happened to the Psygnosis game development house? I've been playing its racing game *Rollcage* for a year now. Also, I was keeping a close watch on when the sequel to *Rollcage* was coming out, but the web site disappeared. I even have the screen saver for *Rollcage Stage 2*.

—Keith Jones

Reviews Editor Josh Norem replies: Psygnosis is most widely recognized for its *Destruction Derby* and *Wipeout* games, which is ironic, because it would appear that the company has now wiped out itself—sort of. In April, Psygnosis announced it was closing down all U.S. operations in order to become a dedicated developer for Sony, which purchased Psygnosis in 1993. Under the new arrangement, Sony Computer Entertainment Europe will absorb Psygnosis, and have its visionaries create software for the upcoming Playstation 2 console.

The arrangement means the Psygnosis team will no longer launch new PC titles, but several titles that were close to being finished when the deal went down should still reach store shelves in one form or another. The title you're interested in, *Rollcage 2*, is rumored to be slated as an OEM game, meaning it will be bundled with hardware items, such as soundcards or videocards, rather than released as a retail product. Psygnosis officials explain the switch from PC to Playstation 2 as a pure business decision: A huge groundswell of demand for PS2 games is already in place, and profit returns on PC titles have been dropping for some time now.

Might We Suggest a Refreshing Cocktail?

I don't know if this actually qualifies as a computer problem, but whenever I have my computer on for an extended period of time, the room gets very hot. The computer runs at stable temperatures, because its five fans blow out all the hot air. I can't turn up the air conditioning, because that will make everyone cold in the rest of the house. It's just this one small room that gets hot. Any suggestions?

—Daniel Lohin

Editor-in-Chief Jon Phillips replies: The heat emitted by your CPU (as well as your videocard and hard drive) might certainly be contributing to your ambient room temperature, but I suspect that your monitor is the worst offender. CRTs are actually notorious heat generators. In fact, I'll always remember a conversation I had with a big-name display manufacturer that had just won a contract to replace hundreds of CRTs with LCD flat panels, reportedly so the client could reduce its air-conditioning bills.

A good LCD could indeed be the answer to your greenhouse problems. Just remember that you'll pay through the nose for a relatively small patch of screen real estate, and LCDs suffer from severe artifacting when not running at their native resolution, which is typically 1024x768. Do you intend to run games at 800x600? If so, an LCD flat panel ain't your bag, baby.

Or you could just bust out for a $30 portable fan from Wal-Mart.

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AOL or CIA?

While I was surfing the net this morning, AOL attempted to access my computer. I'm using Zone Labs personal firewall, which denied access. Why would AOL need to underhandedly gain access to other computers? They didn't ask; they just tried, and, in my case, failed. I'm not an AOL subscriber, and after today, I never will be. I wonder how many other times they have done this without my knowledge. Do you have any information regarding this subject?

—David Drobny

Reviews Editor Josh Norem replies: Before we get into the larger privacy debate, we should caution you that AOL may not be to blame. A third party might actually be spoofing an AOL address, or using AOL as an unwitting conduit for hacking hijinks.

That stated, you should know that AOL recently became the target of a class-action lawsuit for allegedly violating web surfers' Internet privacy. Although it's yet to be proven in a court of law, the lawsuit alleges that users of Netscape's Smart Download feature are being tracked by AOL, which bought Netscape in 1998. Apparently, the program specifically tracks what people are downloading, from any site on the net, and sends the information back to AOL/Netscape. The suit goes on to claim that Netscape's collection of data includes the name, type, and source of the file a user downloads, and collects some cookie information (such as the IP and e-mail address) that uniquely identify the user.

America Online isn't commenting on its legal imbroglio thus far. Our only advice to you is to continue using a firewall, and by all means, don't use Netscape's Smart Download utility until this mess is cleared up.

KX133: How the Mighty Have Fallen

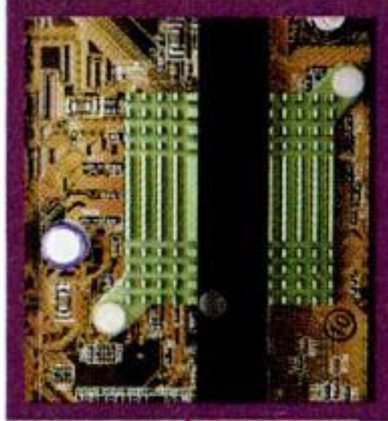
In the May issue, you bragged about the KX133 chipset as the next ultra way to take advantage of the full power of the Athlon, so I went out and bought myself a KX133 motherboard and Athlon 850 processor. I was rebuilding my old Micron MPC200, and wanted to make sure I was getting top technology.

But much to my surprise, shame, and disappointment, in your July "Upgrade Bible," you call this chipset a screwed-up and bug-plagued technology—so what am I supposed to do with this brand new, screwed-up board? I know technology moves very fast, but you could at least add some words of caution when making statements such as, "We like what we found in the AMD reference system. The KX133 definitely seems worth waiting for."

—Paul Jacquemin

Editor in Chief Jon Phillips replies: True enough, our opinion of the KX133 has changed since the May issue. But in our defense, in that initial chipset story, we did in fact write that the chipset *seems* worth waiting for. We expressly used the word "seems" to hedge our bets against unforeseen compatibility problems, and wouldn't you know it, such problems occurred.

When we first played with the KX133 in May, it appeared in an AMD reference box, and the box worked fine. By August, AMD had announced that the KX133 would not work with AMD's new Thunderbird processors (see page 56). Neither AMD nor VIA would take responsibility for the snafu. Oddly enough, some of our readers have found that Thunderbird procs do in fact run in KX133 motherboards. Go figure.



You call this chipset a screwed-up and bug-plagued technology—so what am I supposed to do with this brand new, screwed-up board?

Meanwhile, readers have reported compatibility issues between KX133 motherboards and nVidia's GeForce 2 3D chipset—a chipset that hadn't yet been released when we published our initial KX133 write-up. Who's to blame? Again, no one's accepting responsibility, and for all we know, the mobo vendors, not VIA, may be to blame.

We apologize for not doing a better job in reminding readers that cutting-edge technologies might not play nice-nice with products that don't even exist yet. And for what it's worth, VIA insists its upcoming KT133 chipset will support Thunderbird.

Nixing the Task Scheduler—For Dummies

I take exception to Sean Downey's advice to Shirley Breznai in the August Commport. It's not necessary to hack the Registry to turn off the Task Scheduler. It can be much more easily turned off by going first to the System configuration Utility, then to the Startup tab, and unchecking the Task Monitor and Scheduling Agent. That would have been much less complicated and potentially less dangerous than hacking the Registry.

Registry hacks are really starting to become so "two years ago." In Win95, you had to hack the Registry to truly realize its full potential. All the power users I know used to tweak their Registry for a lot of things, such as increasing dial-up modem speed. But it's really not necessary to do that anymore. It's not the greatest OS in the world, but Win98 does have a few nice little features—such as the System Configuration Utility—to adjust some of these things.

—John Suazo

Editor in Chief Jon Phillips replies: Duly noted, John. It's also important to note some complementary advice expressed so succinctly by a reader named Jeffrey Klepper: "If you download and install the Microsoft Critical Update Notification from Microsoft, it embeds the Task Manager, making it come up every time you reboot, whether you turn it off or not. The only way to make it stop is to uninstall the Critical Update Notification in the Add/Remove icon under Control Panel."

CUT COPY PASTE

▶ In the Gateway Select 1000 system review that ran in our June issue, we accidentally included the pluses and minuses from a Polywell review that ran in April.

▶ In the "Worth Its Weight?" comparison chart that ran in our August issue, we accidentally reported that a 2568MB PC800 RIMM costs $1,000 per ounce. The fact is, 2568MB RIMMs don't exist; we meant to print 256MB.

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trends ► CPUs and DVD recordable

Heat Falls in Hell's Kitchen

Low-Wattage CPUs, DVD Burners Dominate the PC Expo Trade Show

It's not how fast you run, it's how little power you use. At least, that's the message CPU vendors were trumpeting on a hot, humid day at the PC Expo trade show in New York City. Located in the Javitz Convention Center just south of Hell's Kitchen and just east of the oh-so-scenic West Side Highway, PC Expo usually showcases enough awesome processing power to make attendees forget they're in one of the deadest parts of Manhattan. But this year, gaudy PC power was out, and power conservation was in.

Low-power notebooks, CPU "web pads," and Palm-based devices dominated a show that was noticeably devoid of major PC vendors. Biggies such as Compaq and Dell were no-shows, prompting industry pundits to once again predict that desktop PCs are losing ground to information appliances.

Desktop death knells aside, mobile PCs have more mindshare momentum than ever, with Intel, AMD, and Transmeta making big waves with low-power processors. For consumers, the low-power campaign translates into battery-powered devices with longer operating times. How much longer, though, depends on whom you ask and whom you believe.

DARE TO COMPARE: POWER-SAVING CPUs

TECHNOLOGY	VENDOR	STRATEGY
SpeedStep	Intel	Lowers speed and voltage when notebook is unplugged
LongRun	Transmeta	Tweaks CPU speed to match use
PowerNow	AMD	Tweaks CPU speed to match use

The darling of the show was Transmeta and its much-hyped Crusoe processor. Crusoe uses a process called code-morphing that allows the CPU to digest non-x86 instructions (see Inside Sources in the April 2000 issue for full details). Crusoe's main claim to fame, however, is its ability to use less than one watt of power for average computing tasks. Transmeta surprised audiences by showcasing Crusoe-equipped notebooks from IBM and NEC. Hitachi and Fujitsu have also announced Crusoe support. Transmeta and partners say the chip will enable a notebook computer to run for up to eight hours without needing a battery recharge.

Intel officials are skeptical of the claim. They say that LCD screens, hard drives, and DVD-ROM drives, not just CPUs, heavily tax the power in notebooks. Even if you had a CPU that consumed zero watts, claims Intel, the power-supply's stamina wouldn't jump from three to eight hours. Intel itself introduced an ultra-low-power version of the P-III. Running at 600MHz, the new mobile P-III averages one watt of power consumption for pedestrian tasks such as typing in Microsoft *Word*. Intel says it was able to lower the wattage of the 600MHz P-III by cutting voltage from 1.35 volts to 1.1 volts. Optimizations derived from constantly refining its fab process allowed Intel to cut voltages while maintaining high clock speeds.

AMD's new K6-2+ features 128KB of on-die cache and low power techniques.

SPIN CYCLE

This month's top stories broken down ►

HEADLINE	NEWS	DETAILS	THE SPIN	OUR TAKE
Intel, VIA Settle Suit	Clearing the way for even more PC133 chipsets, Intel settled its suit against VIA.	Last year, Intel sued VIA, claiming that VIA violated its right to use the P6 bus.	VIA will pay royalties to Intel, and gain the rights to make its popular Apollo Pro 133A chipset without hassle.	The settlement is just a lull in the legal battle. Intel still claims VIA used P6 patents to make its AMD chipsets.
Faster Modem Speed Ratified	The International Telecommunication Union has increased modem upload speeds by 40 percent.	The new v.92 spec should increase upload speeds from 33.6Kbps to 48Kbps.	"These features will further improve the Internet user's experience by reducing connect times and providing improved access to new Internet services," says ITU.	Don't be fooled—this won't speed up your net experience very much. Get broadband, or pull your hoopty rig off the highway.

For definitions of Terminator words, check out the Terminator online at www.maximumpc.com.

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Don't confuse the new low-power P-III technology with Intel's SpeedStep technology; the two are exclusive, though you'll find them in the same CPUs. SpeedStep notebooks run at full speed when operating on an AC current, but drop down to lower MHz ratings, and therefore lower power consumption, when running on battery power.

Transmeta says that Intel's marketing spin is just that—spin. Crusoe also incorporates memory controller functions that are normally found in a motherboard's northbridge chip, Transmeta says. By bringing the memory controller onboard, Transmeta says it saves an additional two to five watts of power. That's where the chip reportedly realizes the bulk of its savings, which IBM confirmed anecdotally. IBM officials say they've seen Thinkpad battery life jump from four to seven hours after replacing 600MHz P-IIIs with 600MHz Crusoes. However, IBM wasn't using the new low-power P-IIIs, and doesn't have benchmarks to back up its claims.

AMD is also skeptical of Transmeta's claim that its onboard memory controller saves so much power. AMD has its own low-power CPU technology, dubbed PowerNow, that's slated for a new breed of K6-2+ procs. PowerNow enables power use to automatically slide between 200MHz at 1.4 volts and 500MHz at 2.0 volts, depending on the type of application being used. AMD says it can get as much as 38 percent more runtime out of a battery using this technology, and the company has already announced that HP will employ PowerNow procs.

All these battery-saving claims are intriguing, but the three industry players mentioned here lack a uniform definition of "average use," making the hoo-ha somewhat dubious. Does average use constitute typing in *Word* for six hours? Or does it mean typing in *Word*, playing MP3s in the background, and doing occasional work in Adobe *Photoshop*? As with the miles-per-gallon rating for cars, the hours of use you'll get from a Transmeta, Intel, or AMD-based notebook depends on how hard, and how often, you floor the accelerator.

DVD Wars, Episode II

After 12 months of combat, the rewritable DVD wars are only getting bloodier.

At PC Expo 2000, DVD-RAM makers said they've begun volume shipments of higher-capacity rewritable DVD-RAM drives, which hold up to 4.7GB of data per side. Hitachi, Panasonic, and Toshiba say the new drives support faster transfer rates of 22MB/sec, and are available in ATAPI versions. Cost will be about $500—the same as that of the lower-capacity 2.6GB versions that have been on the market for the last two years.

All this forward momentum suggests that DVD-RAM is poised for dominance, but the competing DVD+RW standard isn't backing down. DVD+RW backers Sony, Philips, and Hewlett-Packard say they expect to have their 4.7GB drives available later this year. DVD+RW promises the ability to burn movie discs on your PC and immediately play them back on any consumer DVD deck.

But DVD+RW has a credibility problem. Though the +RW backers promised to ship 3GB versions of +RW last year, the companies weren't able to execute that goal. At PC Expo 2000, the +RW vendors showed off the 4.7GB media and made more promises, while competitors snickered in the background.

DVD-RAM backers showed off an entire roomful of software and hardware, including video recording decks using DVD-RAM discs instead of VHS tapes. In LP mode, the discs can hold up to four hours of MPEG-2 video. SP mode promises two hours, and XP just one hour.

CONT | 18 ▶

DARE TO COMPARE: DVD BURNERS

FORMAT	CURRENT CAPACITY	AVAILABILITY	DETAILS
DVD-RAM	4.7GB	Now	A rewritable format supported by Hitachi, Toshiba, and Panasonic. Enjoys the most momentum.
DVD-R	3.95GB	Now	Pioneer's write-once format for professional authoring use.
DVD-RW	4.7GB	Later this year	A rewritable format pushed by Sony and Philips. Promises the ability to record video and consumer DVD decks.

to the pertinent details.

HEADLINE	NEWS	DETAILS	THE SPIN	OUR TAKE
Windows ME Goes Gold	Microsoft's sequel to Windows 98SE is set to hit store shelves this September.	Windows Millennium Edition adds digital media players, overall system tweaks, and a ton more drivers, for $109.	"Windows ME supports our goal to evolve the Windows-based PC to continue to provide a rich and exciting user experience in the connected home," says Microsoft.	Although Microsoft gave ME the 2000 look, it neglected to give the OS the cool drop shadows that we all love so much.
Rambus Ups Memory Speeds	Rambus says it has developed a technique to up memory bandwidth to 12.8GB per second.	The technique, called Quad Rambus Signaling Level, can send about 1.6GB per pin and will use a 64-bit interface.	"Consumer and communications applications require higher levels of throughput and performance than ever before," says a Rambus spokesperson.	With the memory wars heating up, we'll remain skeptical until we see real-world performance gains.

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technology preview ► wireless

The Bluetooth Connection

New Technology Promises World Without Wires for Handheld Gadget Freaks

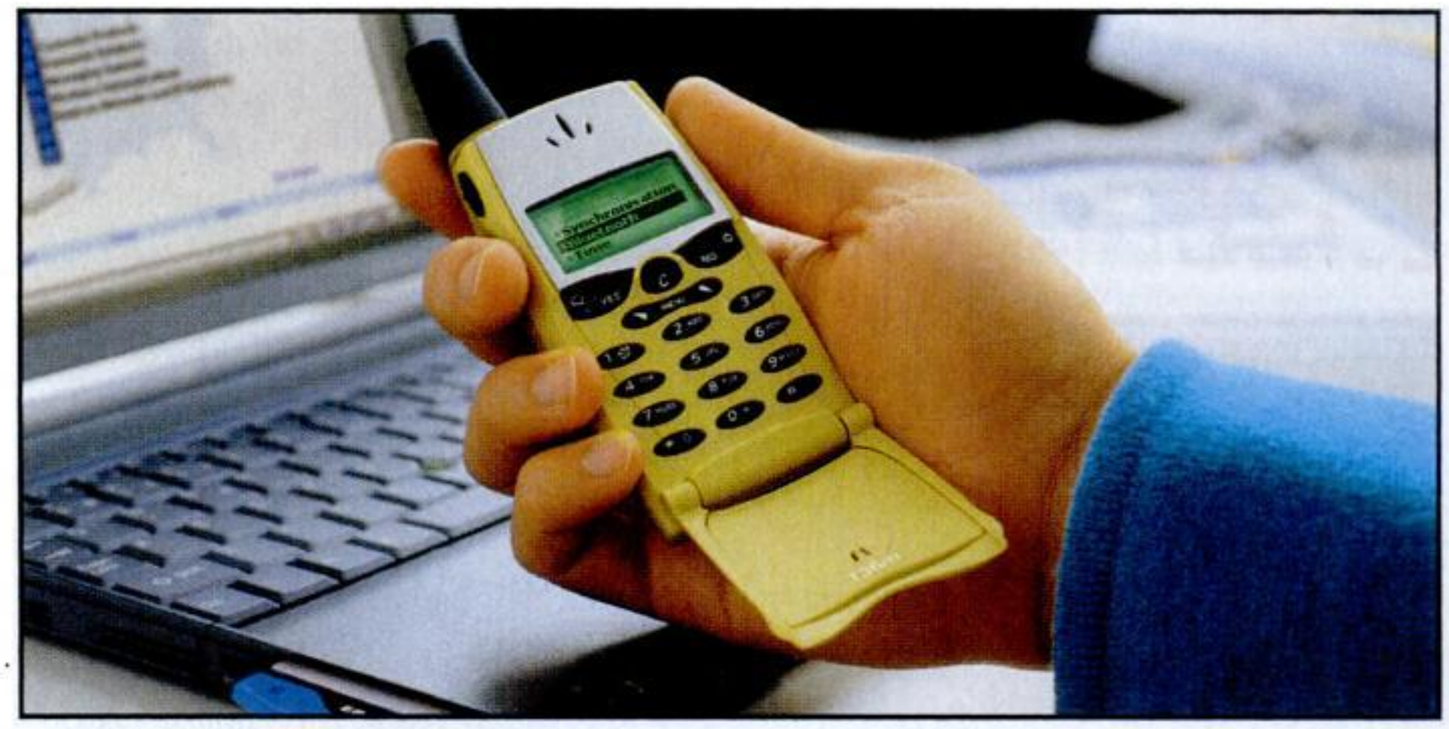
Imagine you're sitting at the airport, waiting to board a flight, and your wireless phone receives an e-mail alert. Using technology called Bluetooth, the phone remotely activates your Palm and notebook computer, and relays the message to both. You may decide you want a hard copy to read on the plane, so you hit the Print button. Your document is then printed at a public printer kiosk, and a small charge is added to your phone bill.

This scenario may not be possible today, but Bluetooth technology could make it a reality sooner than you think. Bluetooth, named for the 10th-century Viking king Harald Bluetooth, was initially developed as a means of replacing the wires on low-bandwidth peripherals with a short-range wireless radio. But the technology's uses are growing beyond its humble beginnings.

In addition to performing such mundane tasks as synchronizing your PDA with your PC, Bluetooth could eventually be embedded into every computing and consumer device. What does that mean? It means that one day soon, you may be able to buy a Coke using your wireless phone, program your VCR with your Palm, and simultaneously synchronize your wireless phone with your cordless phone and your computer. With support for up to three voice channels, Bluetooth will also replace the wires on your Walkman headphones and your cordless-phone headset. But don't expect 100Mb LAN speeds; Bluetooth supports transfer rates up to about 700Kbps.

"We're encouraging companies to walk before they run," says Intel's Simon Ellis, chairman of the Bluetooth special interest group. Intel, along with Ericsson, IBM, Nokia, and Toshiba, is driving the standard.

Ellis says that while great things can come of Bluetooth, it's important that the public's expectations don't exceed what the technology can deliver initially. Today, the reality is that Bluetooth can deliver very little in terms of products, other than prototypes and engineering samples. And questions linger regarding security, bandwidth, cost, interference, and use on airplanes.



"Look at me! Look at me! I'm playing multiplayer *Quake III* on my cell phone!"

Bluetooth operates in the radio spectrum between 2.402GHz and 2.480GHz. Because that spectrum is unlicensed, cordless phones, microwave ovens, and wireless LAN products also run there, and could stomp on Bluetooth signals. But Bluetooth supporters say the technology will be fairly immune from interference because Bluetooth signals will change, or hop, frequencies at up to 1,600 times a second, so that reduction in bandwidth due to interference from other devices will be minimal. Ellis adds that frequency hopping and Bluetooth's short range of 10 meters will minimize security risks. And since Bluetooth uses 128-bit encrypted public and private keys, your network is secure from anyone who shouldn't be there, Ellis says.

Early plans called for Bluetooth-equipped devices to power on when they receive a signal from another Bluetooth device. That raised concerns about safe use on airplanes. Ellis says devices will include an Always Off mode, and that some airlines already safely use microwave ovens that emit radio frequencies in the 2.4GHz range.

The biggest issue is the scarcity of products. Hype about Bluetooth has been building since 1998, but Bluetooth-driven products have yet to reach store shelves.

"There have been a few delays, but that's because [the Bluetooth companies] are making sure they have their i's dotted and their t's crossed," says Joyce Putscher, director of the consumer and convergence group at Cahners In-Stat. "They don't want to rush into the market."

Putscher says it's likely that telecom companies such as Ericcson and Nokia will lead the pack by integrating Bluetooth into phones. As more Bluetooth chips and radios are made, prices should drop from the current $22 per unit, making it inexpensive to add Bluetooth to almost any device. Bluetooth-equipped headsets and phones are expected to be out by the end of the year, along with Bluetooth PCMCIA cards and USB adapters.

Continued from page 17

The DVD-RAM folks also trotted out a smaller 80mm disc. Designed to be used in camcorders, the discs hold up to 3GB of MPEG-2 video, or about 2,000 still images at 1280x960 resolution. The discs can be played in the larger DVD-RAM decks or on PCs. The DVD-RAM backers also say that their new 4.7GB format doesn't need the cumbersome protective cartridge that previous formats have required.

Of course, the rub on DVD-RAM and DVD+RW continues to be the requirement that you purchase a new DVD-ROM drive that's been "DVD-Multi"-certified to read various formats. Any DVD-Multi drive should be able to read most of the current optical specs. Hitachi, Toshiba, and Panasonic DVD-ROM drives currently on the assembly line are reportedly able to read RAM media.

—Gordon Mah Ung

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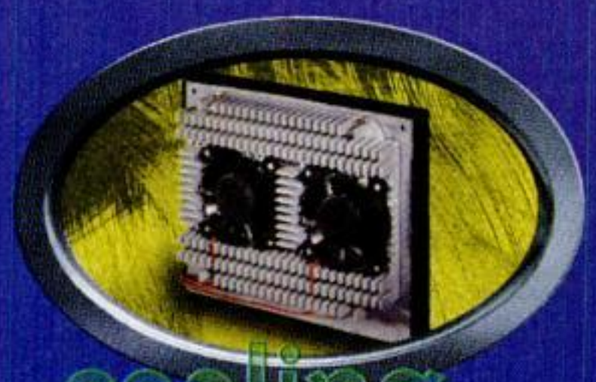

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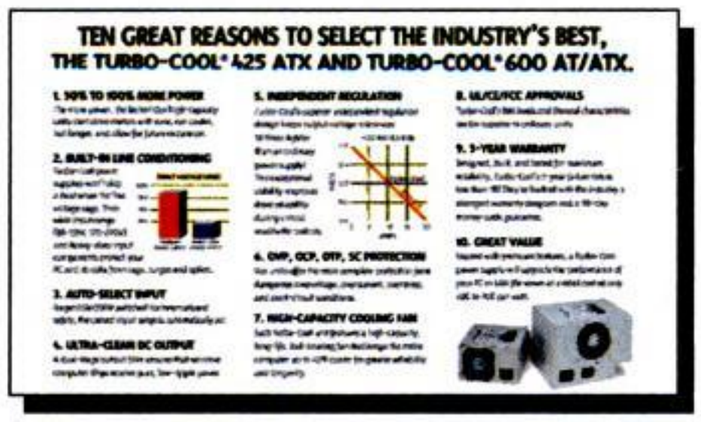
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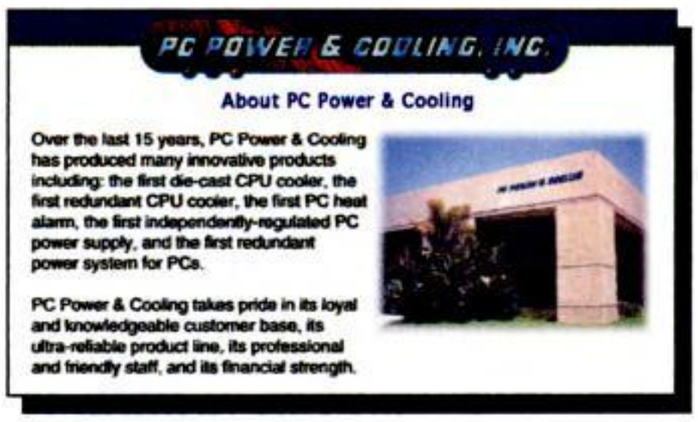
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ILLUSTRATION BY SCOTT LAUMANN

▶ **Maximum PC takes a bite out of bad service and gear**

WATCHDOG

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PHILIPS SETTLES CD-R SUIT

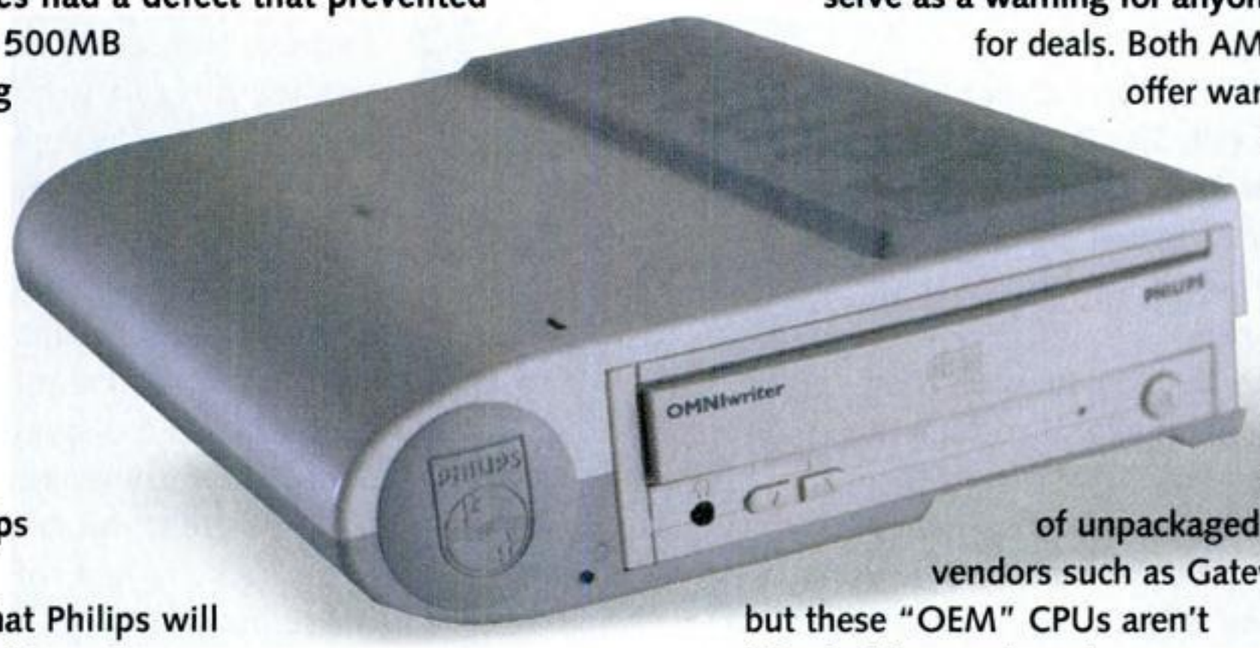
Does your Philips CD-R drive seem to be burning its weight in coasters? If so, you may want to get in on the settlement that Philips reached with consumers who purchased Philips CDD2000 or CDD2600 CD-R drives, or Hewlett-Packard 4020 or 6020 CD-R drives (Philips is the original equipment manufacturer of the two HP drives).

You may recall that The Dog first reported on the class-action suit against Philips in July 1999. Philadelphia attorney Jonathan Shub sued Philips, alleging that the CDD2000 and CDD2600 drives had a defect that prevented them from writing more than 500MB of data to a disk before taking a dump. Shub says a weak spring was the culprit.

In May, Philips agreed to settle the case without admitting to any defects in the drives. Please note that the problem allegedly occurs only in the drives mentioned, and does not affect other Philips or HP CD-R/RW drives.

The settlement stipulates that Philips will repair or replace the defective drives. If a consumer is not currently having a problem with a drive, Philips offers an extended two-year warranty. If a user experiences problems after the extended warranty expires, that consumer is entitled to trade the drive in for a Philips CDD3610 or a newer model.

For those who've already given up on their 2000-series CD-R drives, Philips has agreed to create a rebate fund of $1.1 million to ensure that consumers who have already replaced or sold their drives can receive up to $200 in cash. To qualify for the rebate, you must prove that you owned one of the affected drives, and that you have not already received a refund or had the drive repaired by Philips or HP. If you did replace the drive, present Philips with a receipt or credit card bill showing that another drive was purchased within the time period stated in the suit. Product packaging or manuals may also suffice as proof of purchase. For more details on the settlement and rebate procedures, visit www.cdrecorderclassnotice.com/.



Philips settles suit over CDD2600.

DEAR DOG: In February, I bought an AMD K6-2 450MHz processor from Access Micro. It died in June. I called Access Micro's RMA department and was referred to AMD. AMD told me that the company would not warranty the CPU because Access Micro is not an authorized reseller. Access Micro won't warranty the CPU past 15 days, but its web site says the processor has a warranty from the manufacturer. In e-mail correspondence with Access Micro, a customer service rep admitted that the company knew the CPU was not covered by warranty from AMD. I pointed out that Access Micro's web site says there is a warranty from the manufacturer.

I haven't heard back from Access Micro yet. I know the K6-2 costs less than $50, but that's beside the point. I think companies should honor what they print.

—Richard Ramsey

THE DOG RESPONDS: **As long as there have been PCs, there have been PC bargain hunters. Richard's problem should serve as a warning for anyone on the prowl** for deals. Both AMD and Intel offer warranties *only* on boxed products—that means CPUs in the companies' retail packaging. AMD and Intel sell trays of unpackaged CPUs to PC vendors such as Gateway and HP, but these "OEM" CPUs aren't intended for purchase by consumers. However, to cater to the bargain hunters' market, some stores sell OEM parts to the general public. AMD and Intel—and other component makers, such as videocard or soundcard vendors—only warranty OEM parts for the reseller or PC vendor. If you buy an OEM CPU from a store, you can only get service through that store. If the store goes out of business, provides horrible service, or, as in Richard's case, isn't even an authorized reseller, you're screwed. Most people take the risk because it's rare that a CPU takes a powder. But if you want to avoid getting burned, The Dog recommends that you spend the extra $20 or $30 to get the boxed version of the CPU. (Also keep in mind that if you overclock your CPU, you immediately void any warranty.)

On Richard's behalf, The Dog contacted Access Micro officials. They agreed that the web page statement was unclear.

If a consumer is not currently having a problem with a drive, Philips offers an extended two-year warranty.

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In another section of the web site, however, Access Micro does explain that its warranties on OEM equipment vary, depending on the manufacturer. Access Micro officials said they would contact Richard to exchange the processor, and would clear up the language on the site.

I NEED MY KLIPSCH

DEAR DOG: After reading the Maximum PC review of the Klipsch ProMedia speakers, I decided that I had to get a set. The only problem is that Klipsch's web site states that the company ships only within the U.S. I live in Alberta, Canada. I can't see how Klipsch can exclude all of Canada from obtaining its wonderful product.

—Nathan Tredger

THE DOG RESPONDS: Nathan, The Dog contacted Klipsch about the export problem, only to discover that the same regulations prohibiting exportation of strong encryption software, bomb-grade uranium, and supercomputers also apply to Klipsch speakers. Just as Canada tries to protect its tactical advantage in hockey and beer technologies, the U.S. government protects its sonic advantage by keeping the ProMedia speakers under wraps at home.

Just kidding. Mark Casavant of Klipsch tells The Dog that the web site restricts sales to the U.S. because the site is designed to handle only U.S. dollar transactions.

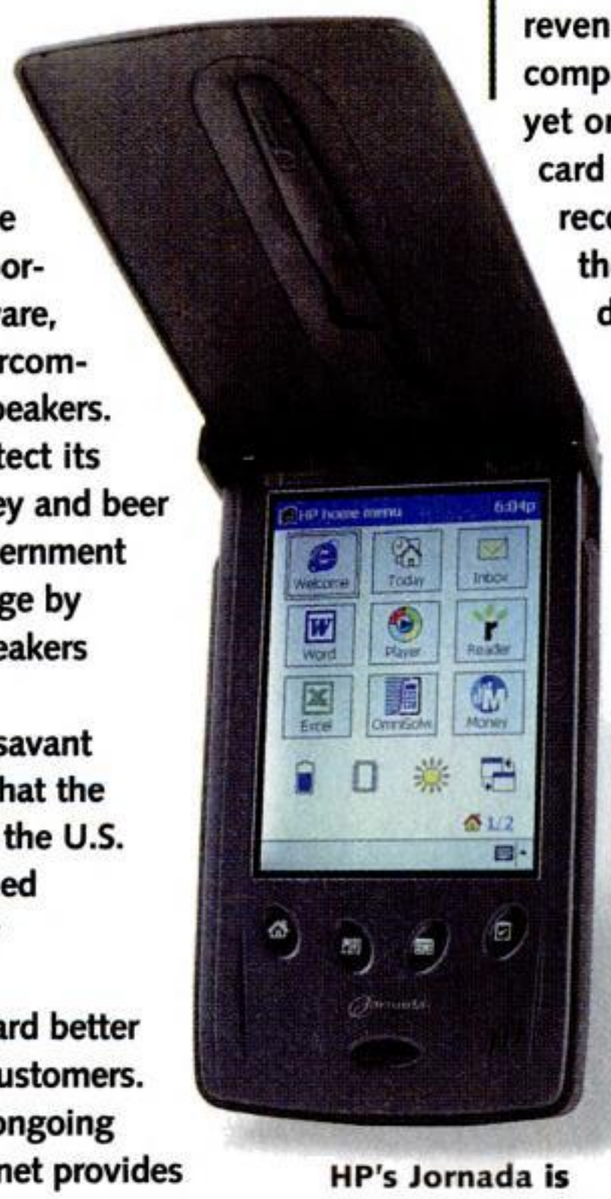
"We are building toward better service for international customers. It is certainly part of our ongoing e-commerce plan, as the net provides a global marketplace for the ProMedia product line. Right now, the best channel for Canadian customers is through retail outlets, such as London Drugs. Since inventories have been tight due to demand, we hope to fulfill orders by month's end," Casavant said.

"We've put processes in place to make sure this never happens again, of course."

THE DOG REPLIES: The situation has gone from bad to worse at Aureal. According to former and existing employees that The Dog gnawed bones with, Aureal has been running on less than a skeleton crew since its entire executive staff and management teams resigned and the company filed for bankruptcy this spring. In fact, in a sign of how dire the situation is, the company's web site is down because, "It broke, and there's no IT person to fix it," one insider whispered to The Dog. One section of the site is still up, though, and that's http://support.aureal.com.

The latest drivers for the Vortex-series soundcards were available as of July. The Dog recommends that you visit the site, download the drivers, and commit them to CD before that dries up, too.

What went wrong with Aureal? Insiders say that a costly legal battle with Aureal's arch-foe, Creative Labs, cost the company millions in legal fees, and that investments in an Internet audio product and speakers didn't net enough revenue when the company suddenly needed it. The company is up on the blocks, but there's no public word yet on any takers, and no word on whether the SQ3500 card will ever see the light of day. As sad as it is, The Dog recommends that you avoid Aureal-based products until the financial situation clears up. A soundcard without driver support is no soundcard at all. Woof.



HP's Jornada is colorblind.

POCKET ERRATUM

Perhaps Hewlett-Packard hired the same NASA contractor who, by forgetting to convert standard American measurements to metric, caused the loss of a Mars space probe.

Hewlett-Packard has acknowledged that its new Jornada Pocket PC was mistakenly built with a 12-bit display chip instead of the 16-bit display chip promised. The screw-up means all HP 540-series Pocket PCs can display only 4,096 colors, instead of the 65,536 colors intended. HP's 430 Palm-size PC also uses the 12-bit chip instead of a 16-bit chip. The 430 was also to have offered a 65,536 color screen.

"We've put processes in place to make sure this never happens again, of course," an HP spokesperson says. "If you've been happy with your product, this error does not change the functionality of the product."

Interestingly, few customers have complained about the missing 16-bit color. HP attributes this to the Jornada's vibrant display. Still, the company is promising to make good on the boo-boo. Those who purchased the 540 and 430 models can return the units to HP for refunds. Customers should present itemized receipts; if they cannot provide those, they should at least be able to state from where and in which month they purchased the unit.

The 420 Jornada also uses the 12-bit chip, but HP is not offering refunds on those devices, because the 420s were not sold as 16-bit-color units. However, the 420 cannot be upgraded to 16-bit color via a software download, as was originally reported by HP. To reach HP customer service, call 970.635.1000.

AUREAL UPDATE

DEAR DOG: In your July column, you wrote that Aureal would still be creating drivers for its soundcards. So where did it hide its web site? I went to Aureal.com and A3D.com (same IP, I know) and they don't exist. No pinging either. Linux.aureal.com still exists, but no Aureal. Where am I going to get the drivers that I need for Win98? I didn't save the newest ones, because I figured the web site would still be up and running.

—David Helfinstine

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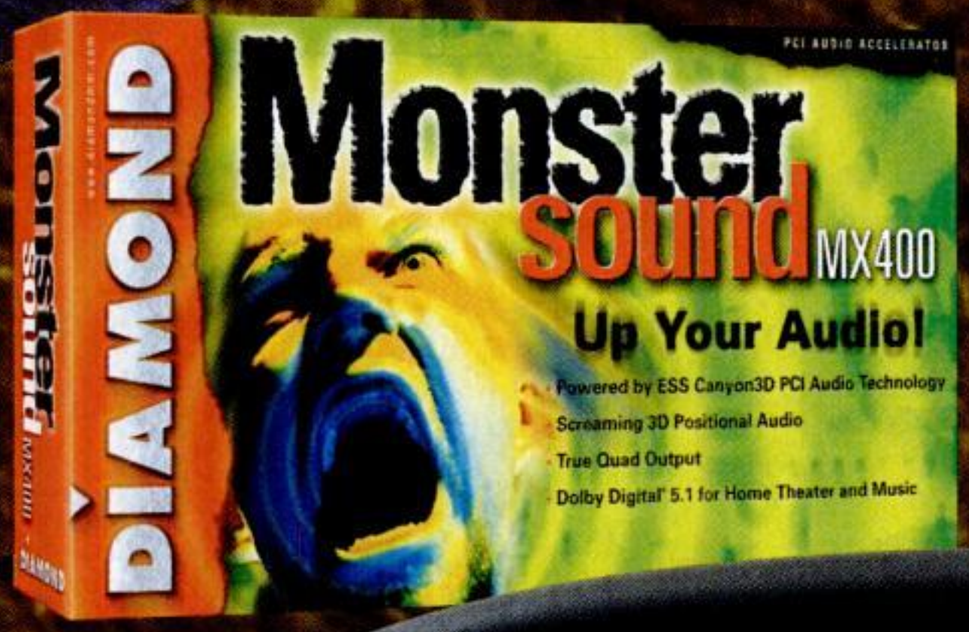
Screenshot of Slave Zero courtesy of Accolade.

**Requires Dolby Digital receiver*



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PERIPHERAL VISION

Casio Freedio FZ-500P Super-Compact Printer

From the "Cuttin' it down to size" department comes the Casio FZ-500P Super-Compact Printer (**www.casio.com**). Roughly the size of a Walkman, the FZ-500P can link to a computer via a parallel or IR port, and offers 400dpi resolution at 64 grayscale levels. The device uses a direct thermal burn process to print about one mini-sized page every three to five seconds. Users can adjust the print density and contrast, and can set the connection method through buttons on the unit. If you're out of paper, you can save small documents in the printer's onboard memory. The FZ-500P comes with a charger and a packet of business-card-sized paper. Casio also sells a base charger unit with a parallel connection in the back. **$250 | Casio**

Buy **www.SeeMeBuyMe.com 877.751.7467 ID#0901**

Creative Video Blaster WebCam GO Plus

It's a web cam...No, wait, it's a digital camera...Hold on, it's a movie camera. OK, it's actually all of the above. The Creative WebCam GO Plus (**www.creative.com**) is the Swiss Army Knife of web cams—it's perfect for dedicated web cam duties or for snapping pics on the go. When hooked up to your computer via USB, it can act as a live web cam, recording footage at up to 30 frames per second that can be imported as an AVI into other applications, or filed into a video scrapbook with the included Creative software. When undocked, WebCam GO Plus' 8MB of memory (7MB for pics and 1MB for voice annotation), focus-free lens, and single-snap or burst mode let you take pics of anything your heart desires—even self-timed shots. The VGA CMOS image sensor will capture still images in 24-bit color at resolutions up to 640x480. **$150 | Creative**

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Olympus Eye-Trek FMD-150W-US

Watching flicks unfit for small fries while flying the friendly skies has never been easier. The Olympus Eye-Trek glasses (**www.olympusamerica.com**) plug into VCRs, camcorders, TV, and DVD players through standard A/V or S-video hookup, and simulate the look of a 62-inch big screen seen from about six-and-a-half feet away. Two LCD screens sport 240,000 pixels apiece for crisp, clear images, and a free-shaped prism assures sharpness both indoors and out. The wearer can choose from four display settings—standard, cinema, wide, and zoom—and can adjust brightness, contrast, and color. Built-in headphones with surround sound and a bass boost assure that big explosions and firefights take place in total privacy. A nose guard adjusts for those with or without glasses. There's even a password protection screen to keep jealous passengers from raiding your "private" onboard entertainment while you're in the john. **$90 | Olympus**

Buy **www.SeeMeBuyMe.com 877.751.7467 ID#0903**

For definitions of Terminator words, check out the Terminator online at www.maximumpc.com.

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Don't let your CD sessions go to the dogs

If you've got an inefficient drive—and there are many around—excessive speed during a burn session can kill a disc. The faster the drive attempts to burn, the harder it becomes for the drive's buffer to process the data in a continuous manner. The result? Buffer underrun errors, which can bring recording sessions to a screeching halt. When that happens, your CD disc will be nothing more than a frisbee, ready to flip to the family dog.

PlexWriter 12/10/32A ensures a quality burn

Choose an efficient Plextor® drive, like the new PlexWriter™12/10/32A CD-rewritable E-IDE (ATAPI-4) drive, and you'll get blazing speed without creating useless CDs. Write at 12X, rewrite at 10X and read at 32X—faster than ever before.

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Instead of flipping out, run in to your nearest Plextor dealer. For the address, call **800.886.3935**, or visit the Website at **www.plextor.com**.

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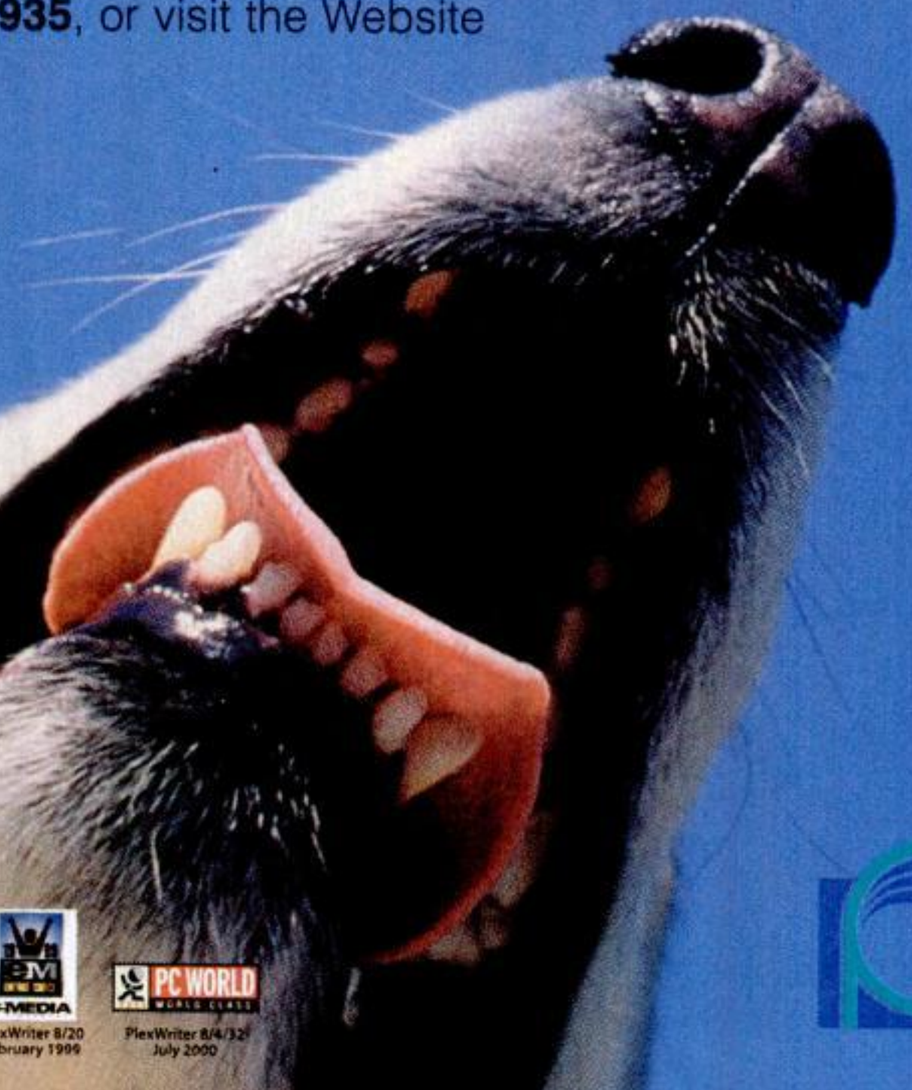

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FAST FORWARD

MP3 Wants to Be Free!

WHAT'S A FAIR PRICE FOR DOWNLOADABLE MUSIC?

Hollywood portrays the teenage computer whiz in one of two ways: as a hopeless geek with a pocket protector and taped eyeglasses, or as a way-cool nonconformist who dresses like Marilyn Manson or Xena the Warrior Princess. The first stereotype, I understand. But how does spending time on a keyboard make you a rock 'n' roll rebel? After all, millions of conservative accountants do that every day.

If you traffic in MP3 files, however, you actually might be a rebel. Judging from the latest hysteria, MP3 is this generation's LSD. Some people think MP3 is a revolutionary form of recreation that makes you cool. Others think it makes you a criminal. Some say it could improve your mind under controlled conditions. Critics insist it's destructive no matter what.

The debate matters because if you're a typical computer user, chances are that the next piece of data you'll acquire is an MP3 recording. Acquire—not purchase. Because if you're a typical user, you probably won't pay for the MP3. And that makes you a rebel in the eyes of the U.S. government, the Record Industry Association of America, the rock band Metallica, and the rapper Dr. Dre (talk about strange bedfellows).

Some of the MP3 panic is overblown. People have been downloading copyrighted music since the 1920s. That technology is called radio. People have been copying and sharing copyrighted music since the 1950s. That technology is called tape recording. People have been selling bootlegged copyrighted music since the days of wax records. That technology is called unfettered capitalism. What's new is that MP3 makes it easier than ever to download and bootleg copyrighted music by exchanging bits instead of atoms. That technology is called personal computing.

Who can blame the record industry for not seeing it coming? After all, PCs have been evolving toward this point for only 25 years.

I'm being sarcastic, of course. But certainly, the record industry deserves a share of the blame. Until quite recently, it persisted in treating recorded music as physical matter that had to be manufactured, packaged, shipped, and sold in stores at no small expense. There have been experiments with in-store kiosks that burn CDs and print album jackets on demand. Such a delivery method saves the enormous costs of manufacturing and shipping while relieving retailers of inventory problems and making larger catalogs of music available to consumers. But the experiments have been half-hearted, as if the industry never anticipated that consumers would eventually find their own way of doing the same thing.

People have been downloading copyrighted music since the 1920s. That technology is called radio.

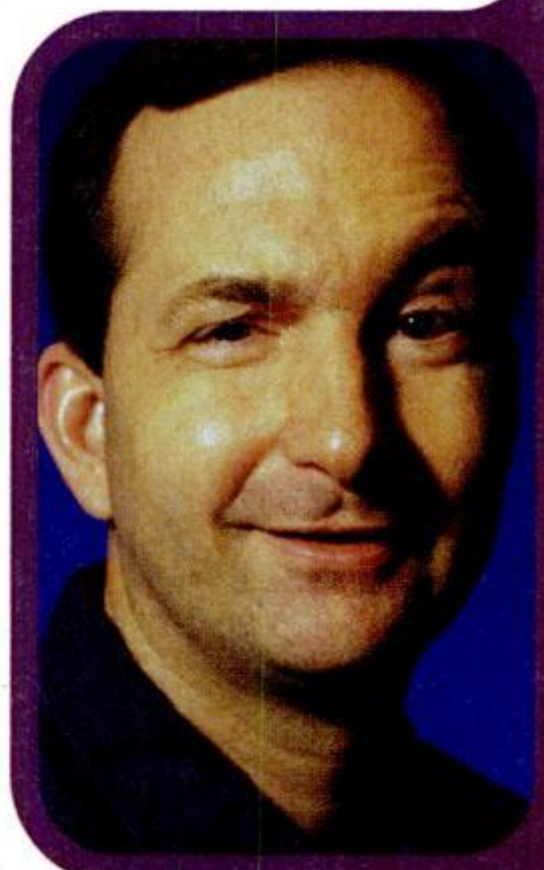
The record industry also deserves blame for not offering media formats that complement the ways people want to listen to music. CDs are fine for home stereos, but they're too big for the portable players that people wear while exercising, their clumsy jewel cases are hazardous to open while driving a car, and they're not as scratch-proof as we were led to believe in 1982. The MiniDisc format is a fair stab at a solution, but you have to buy an expensive recorder and dupe all of the music you already have, because prerecorded MiniDiscs are relatively scarce.

The industry also goofed by not replacing 45rpm records with a comparable singles format. The MP3 craze makes it clear that people want choice—the freedom to pick and choose individual songs, rather than buying whole albums just to get one favorite track.

But MP3 fans aren't blameless, either. "MP3 wants to be free!" some proclaim. Perhaps these people should set an example by spending half their lives mastering a musical instrument, writing songs that are good enough for other people to hear, arranging and mixing a professional recording—and then giving it all away for free. Let's get serious. Musicians, songwriters, arrangers, and producers deserve some reward for their years of creative struggle. If they choose to distribute free samples as an enticement, fine. But don't play the gimme game if you won't give anything back.

The computer and recording industries are collaborating on the Secure Digital Music Initiative, which uses encryption to allow downloading and personal copying, but not unlimited redistribution. At a fair price, it's a fair solution. But what's a fair price? Sony proposes $2.98 for a single. If that sounds exorbitant, consider that a 45rpm single cost 65 to 75 cents in the 1960s, which equals about $3.50 in today's dollars, after adjusting for inflation. (Yes, you got two songs on a 45, but the flip side was usually a throwaway.)

Since 45rpm singles were popular for 25 years and were affordable for most teens in those days, I think comparable pricing for MP3 singles would be fair today. Then again, maybe today's music is worth less. Don't get me started on that subject.... ✹



TOM HALFHILL
was senior editor at *Byte* magazine and is regarded as one of the most knowledgeable experts on processor technology in the industry. Contact him at **thalfhill@maximumpc.com.**

Random Thoughts

▶ Some listeners scorn MiniDisc because it uses data compression that slightly degrades sound quality. But MP3 compression is usually more extreme and degrades the sound to an even greater degree. This is progress?

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▶ THE SCOOP FROM A MAJOR PLAYER

GAME THEORY

Some people are made of Teflon. Take our president, for instance. Absolutely nothing—no failure, no criminal act, no stupid comment—sticks to him. Some game companies seem to have this quality. Blizzard is the prime example, since the hosannas being sung about *Diablo II* are well out of proportion to what's actually been delivered.

Blizzard is invulnerable for good reason: It's earned it. *Starcraft* was among the cleanest, most finely tuned, well-balanced strategy games of its day. Blizzard held the game long past the promised release dates in order to get it just right. That kind of dedication to quality gaming deserves credit in an industry that too often screws the consumer.

So when *Diablo II* was late, and then later still, fans were really, really excited—they assumed that Blizzard was doing with *Diablo II* what it did with *Starcraft*. But maybe the Blizzard folks were playing a lot of *Tetris* during the last seven months, because I don't see an extra seven months of effort in *Diablo II*.

Before I get barraged with heated letters from *Diablo II* loons (I don't mean *you*, of course) who feel the need to defend their game, let me say for the record that I think the game is fine. It plays as well as the original and has some inventive levels and gameplay. A few new tricks, such as the skill tree and the added classes, lend depth to a classic design. The interface remains a monument to sleek functionality, and the cinematics are some of the finest I've seen. Though early levels that were obviously completed long ago crystallize the flaws of a long development cycle, the later levels play really well. all, it's a solid A-minus.

Why oh why, then, am I seeing nearly every reviewer and many fans treat this as an A-plus/home run/slam dunk? As though it's state-of-the-art gaming in the year 2000? Because really, folks, it's not. Not only do I think the extra time was *not* used wisely, but I wonder how it was used at all. The very first day I got my copy of *Diablo II* and loaded it, I was required to download a substantial patch—and the game was *still* buggy. Multiplayer was a mess. The servers were failing the stress test because Blizzard—get this—didn't think so many people would be logging in. (Didn't the company just spend two years priming the hype pump for that exact result?) *Diablo II's* Save Game is cumbersome, and reloading levels causes monsters to respawn, creating a new litmus test for tedium. Graphically, the game is no better than the original, which is now three years old and well past its prime. And it's got a maximum resolution of 640x480. *Lemmings Revolution* has a better res level.

Bulletproof Blizzard

WHY IS BLIZZARD GETTING PRAISED FOR ITS SO-SO GAME?

The very first day I got my copy of Diablo II and loaded it, I was required to download a substantial patch—and the game was still buggy.

When you get right down to it, *Diablo* and *Diablo II* are linear clickfests with strings of rather repetitious monsters. The diverse skills, interesting levels, and compelling story carry it past these failings, but a perfect game it is not. Game of the year it is not. And frankly, it is very far from what many of us hoped it would be.

Last year, a game called *Revenant* was released and dismissed by many critics, subsequently slipping into oblivion. *Revenant* had its own share of problems, but it gave the *Diablo* formula a new spin by allowing the user to create more elaborate combat attacks. You didn't just click to attack—you were able to slash, hack, and charge. *Revenant* added much to the formula, and *Diablo II* would have done well to take a page from its design doc.

Or let's look at *Vampire: The Masquerade—Redemption*, which covers similar turf in a different—and to my mind, better—way. *Vampire* hasn't been dismissed the way *Revenant* was, but it was pecked to death by many of the same people who've let *Diablo II's* similar flaws pass without comment. People have hung *Vampire* out to dry for its linear structure, bad Save Game, and problematic pathfinding, but glossed over these issues with *Diablo II*. Of the two, *Vampire* is more deserving of praise because it tries something new, and generally does it well. The combat is diverse and rarely devolves into the *D2* click-of-death sort. And, frankly, it has a better story and more ambitious multiplay element.

So why piss on Blizzard? I *like* Blizzard. I think its games generally show a refined sense of balance and design. I think it cares about gamers and games. But *Diablo II* isn't what it should have been, just like *Tiberian Sun* wasn't what it should have been. With all the company-generated hype and all the extra development time, this game should be bug free, and it should certainly be more than just a retread. ✹

T. LIAM MCDONALD is a veteran gamer and game writer. His reviews appear regularly in *PC Gamer* and other publications. Write him at **tmcdonald@maximumpc.com.**

Random Thoughts

▶ Interplay wins a battle but loses the war. *Klingon Academy* is certainly the best *Trek* combat game to date, despite the requisite bugs. The supreme irony is that Interplay creates a good *Trek* game a full decade after its triumph with *25th Anniversary* and *Judgment Rites*, only to lose its *Trek* license to Activision. The same Activision that gave us *Star Trek Hidden Evil* and *Star Trek Conquest*.

▶ *Warlords Battlecry* is in danger of being ignored, which would be a real shame. *Battlecry* is what *Total Annihilation: Kingdoms* promised to be. It's a playable, deep, narrative RTS game in a fantasy setting. A custom skirmish mode, long campaign, full MP support, and mission editor make this one of the most well-rounded RTS titles of the season.

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We give you the ultimate PC...

Dream Machine 2000. The dual-booting, dual-everything computer that no system vendor would ever dare to build. A concept PC so decadently configured, its spec sheet reads like a bill of lading for a Fry's megastore, not just the parts list of a mere personal computer.

In late June 2000, we hotly debated the configuration of our otherworldly creation. In early July, we carefully constructed the behemoth in our Lab, hoping that the fates would be with us and the awesome monstrosity would boot. With more than a little cajoling and tinkering, boot it did. And now we unleash the beast upon the world at large.

In years past, we put a $5,000 limit on our Dream Machine creations. Our goal was always to build the best PC possible under a reasonable price ceiling—a PC that our readers could re-create for themselves at home.

This year, in a defiant response to the ever-diminishing cost of technology, we threw all price barriers out the window and built a PC that answers the timeless question, What if? What if price really *were* no object? What if we went all out, sub-system by sub-system, until the Dream Machine resembled not a high-end OEM box, but an extravagant freak of technology?

The answer to this question begins on the next page. We start with a part-by-part description of the Dream Machine's innards. On page 42, we document the construction of our concept box, highlighting the engineering tricks that make it special. On page 44, we present our performance numbers and provide a high-detail shot of what's under the hood. We close with a look at Dream Machines past, and at what may lie ahead. It seems impossible now, but the dream can be improved upon—a new year means new parts and new performance goals in the quest for ultimate PC power.

Advisory: Do not attempt to re-create Dream Machine 2000 at home, unless you have wads of cash and an overwhelming desire to realize PC perfection.

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machine 2000

CPUs

Dual 1GHz Intel Pentium IIIs

$1,100 per CPU, www.intel.com

Choosing dual Pentium III Coppermines instead of a single Athlon Thunderbird is a controversial decision indeed. Late-breaking Thunderbird benchmarks aside, Intel's flagship CPU offers mind-numbing, kick-ass performance. It ticks along at 1GHz, features 256KB of full-speed L2 cache, and is supported by a stable mobo infrastructure. Of course, reliability was of utmost importance to us; we might be *Maximum PC*, but we lack the close financial and intellectual partnerships that come in so very handy when trying to determine why pieces of cutting-edge, high-octane hardware don't play nice with each other.

Why We Chose It: First, we wanted Dream Machine 2000 to be the first dual-proc rig in Dream Machine history—and no Athlon chipset currently supports SMP. Second, because of the timing required to get this issue to press, the Dream Machine configuration had to be nailed down before we even had Athlon T-Birds to play around with for consideration. This left us to choose between dual P-III Coppermines and a single first-gen Athlon—and as you already well know, at 1GHz, the first-gen Athlons can't keep pace with Coppermine P-IIIs. (The new Thunderbird Athlons, however, settle the score; see page 56.)

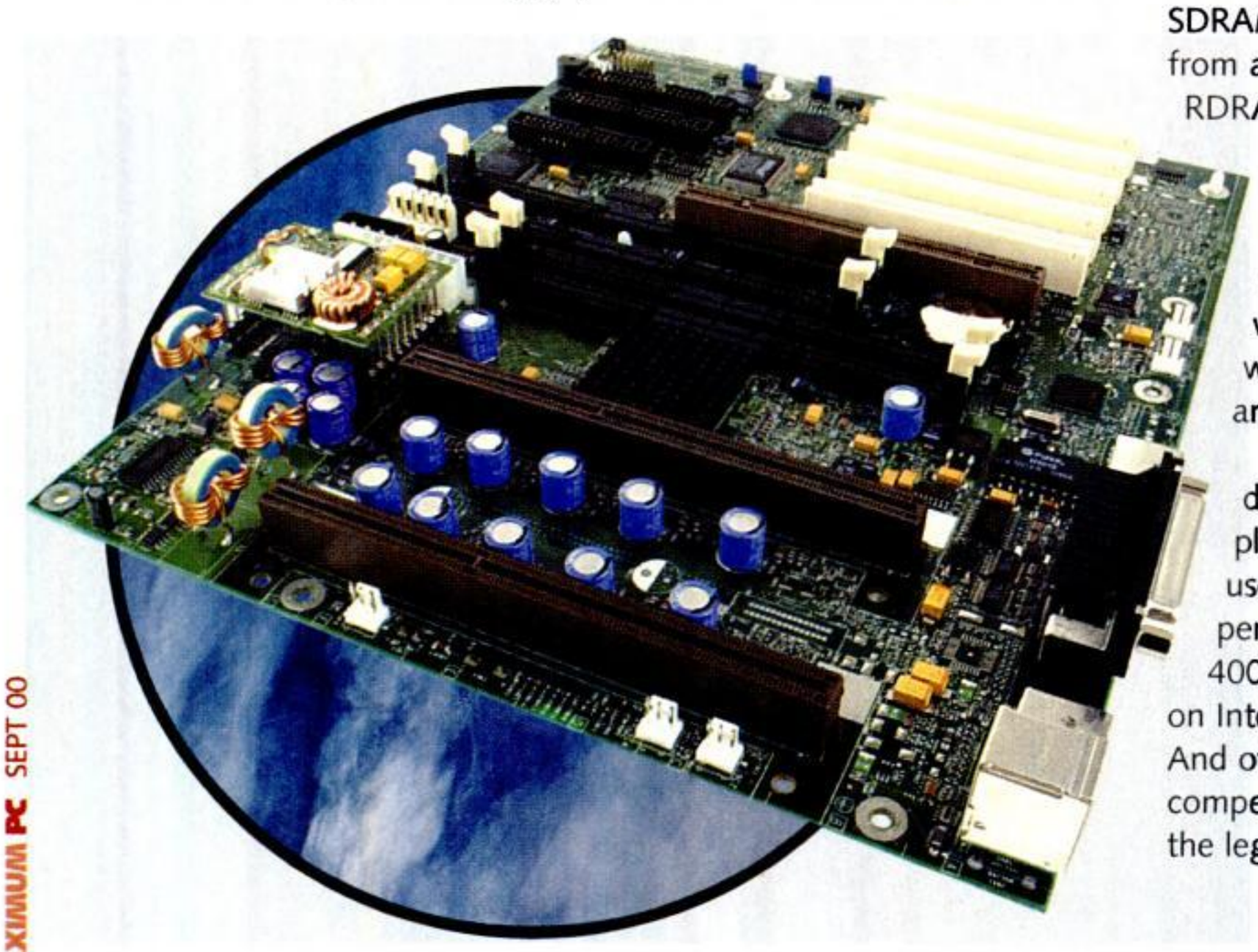
Budget Alternatives: If you don't have dual CPU needs and don't care about hitting 1GHz, you can save two weeks' pay by clocking down to a 933MHz Pentium III or a 900MHz Thunderbird Athlon. Your purchase should be based on either Socket 370 or Socket A, as slotted CPUs and motherboards will become oddities within a year.

Motherboard

Intel OR840

$330, www.intel.com

Intel's OR840, or "Out Rigger," includes four must-have features that won our hearts: dual-proc support, dual-channel Direct RDRAM support, onboard 10/100 Ethernet, and support for AGP Pro 50, the 50-watt spec for pro-level videocards.



Why We Chose It: Our dreams of dual-proc action eliminated all Athlon boards. We were also intent on dual-channel RDRAM support, effectively eliminating all 820 boards and the bulk of dual-proc 840 boards, which are all committed to SDRAM. We finally landed on the Intel OR840, the only mobo from a top-tier vendor to offer dual Slot 1s, and dual-channel RDRAM support. Sure, at press time, Supermicro was prepping its Super PIIIDR3 with onboard 64-bit PCI and SCSI, but it wasn't yet ready for evaluation. So why, you ask, go with 840 over a chipset that supports PC133 SDRAM? Because 840 supports dual-channel RDRAM, which offers 3.2GB/sec of bandwidth (twice the bandwidth of the more popular single-channel RDRAM), and, in our experience, bests PC133 performance.

Budget Alternatives: If you don't have your heart set on dual procs and RDRAM, your options are cheaper and more plentiful. We don't recommend any 820 or 840 boards that use the memory translator hub, because the hub suffers a performance hit. Better alternatives include the Tyan Trinity 400 or Soyo 6VCA for budget SDRAM support. Mobos based on Intel's new 815 chipset also look to be worthy alternatives. And of course, that old war horse, the 440BX, is still damned competitive in such trim as MSI's BX Master, which pushes the legal limits of overclocking through a software interface.

For definitions of Terminator words, check out the Terminator online at www.maximumpc.com.

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Memory

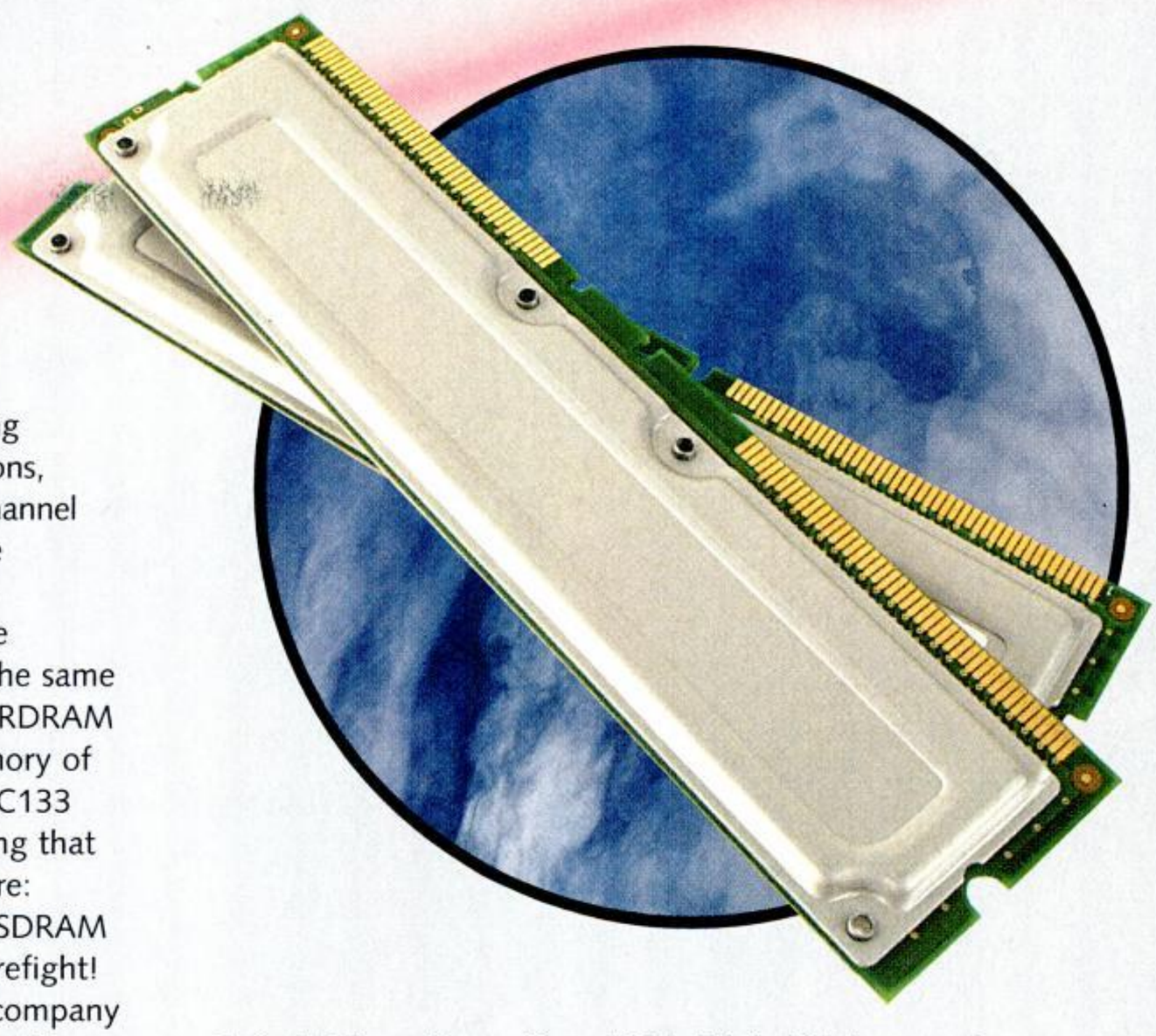
Dual Kingston PC800 256MB RIMMs

$990 per module, www.kingston.com

Love it or hate it, Rambus' pricey Direct RDRAM is beginning to look more viable every day. In single-channel configurations, RDRAM hits 1.6GB/sec of bandwidth. Paired with a dual-channel chipset like the 840, it pushes 3.2GB/sec using two separate RIMMs. We went for two 256MB RIMMs.

Why We Chose It: In two years, PC133 SDRAM will be about as exciting as a box of moldy EDO SIMMs. But in the same timeframe, we think you'll still be able to use your Direct RDRAM modules. RDRAM has Intel's blessing and will be the memory of choice for the Pentium IV. Performance-wise, it outruns PC133 memory in most benchmarks. In fact, there's only one thing that can derail the Direct RDRAM train in the foreseeable future: DDR SDRAM. Of course, you won't be able to buy DDR SDRAM systems until the end of the year. We can't wait for the firefight!

We selected Kingston's memory modules because the company has a good track record for quality, and enough muscle to ship 256MB RIMMs in volume to consumers. 512MB of RDRAM is quite a nice checklist item—as long as someone else is footing the bill.



Budget Alternatives: If you think it's foolish to spend $2,000 on 512MB of memory, spend $200 on 256MB of PC133 SDRAM instead. Just be sure you have a compatible motherboard and chipset.

Videocard

Hercules 3D Prophet II 64MB

$400, www.hercules.com

With its teal PCB and turquoise heatsinks, the 3D Prophet II is significantly more colorful than other GeForce 2 boards, with their drab emerald color schemes. But Guillemot's big blue board doesn't need a different color to stand out from the crowd. As the first card to mate 64MB of DDR memory with nVidia's GeForce 2 GTS graphics processor, the 3D Prophet II 64MB is the most powerful videocard on the scene. It's primed for anything that game developers can throw at it, and is currently the most obsolescent-proof videocard available.

Loaded with advanced features such as hardware T&L and programmable shader support, the GeForce 2 can pull off a ton of new 3D tricks that will make next-generation games shine. That, combined with double the high-speed DDR memory of any other GeForce 2 board, makes the 3D Prophet II 64MB capable of blowing through the most complex 3D environments without breaking a sweat. With this kind of power, you can smoothly run every game you own at 1024x768 in 32-bit color with all the detail settings cranked up.

Why We Chose It: We like the color blue. We also like the fact that the 3D Prophet II 64MB is more videocard than you'll ever really need. 64MB of DDR memory is overkill, but it does provide more than enough space for games to store large textures in local memory, instead of forcing them to access the AGP bus in order to hit up system memory. Of course, only a few games, such as *Quake III*, push around that much detail, but several upcoming games are moving toward complex environments that will put *Quake III* to shame. A 64MB videocard isn't all that necessary right now, but it will be next year.

Budget Alternative: While the GeForce 2 GTS is the king of the 3D ring, it's really just an enhanced GeForce that's been clocked up. With the GeForce 2, you pay dearly for the extra speed—between $300 and $400. A thriftier upgrade at this point would be a DDR GeForce, such as Creative Labs' Annihilator Pro, which you can find for about $225.

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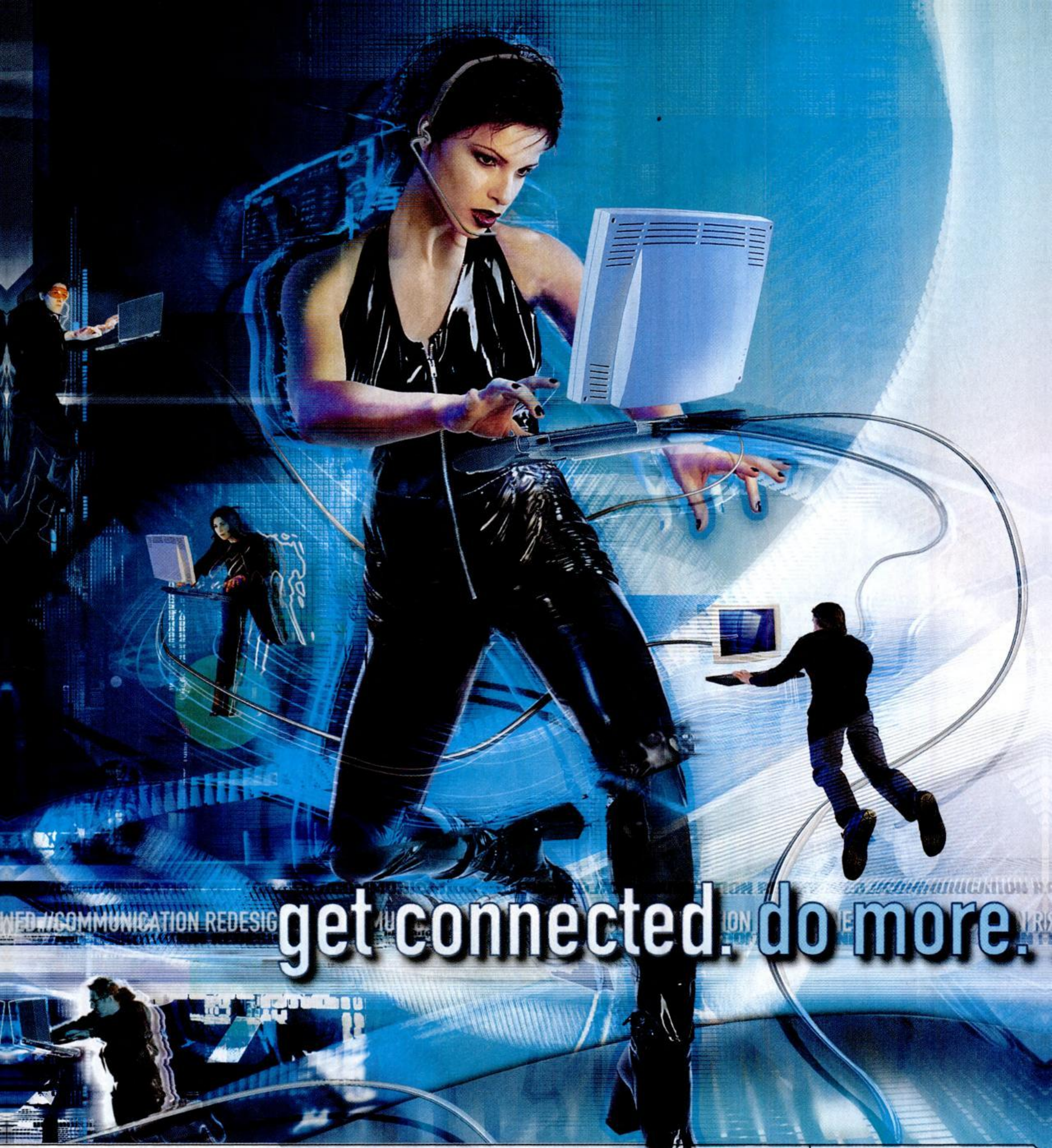


Gratify your need to gather.

Socket gets you connected online. Interact via text or voice. Find and launch shared programs. Play games together. Share content, photos, MP3s—any file—effortlessly. Instantly gratify your need to gather. Socket is your electronic forum. Don't just chat there, get connected. Do more.

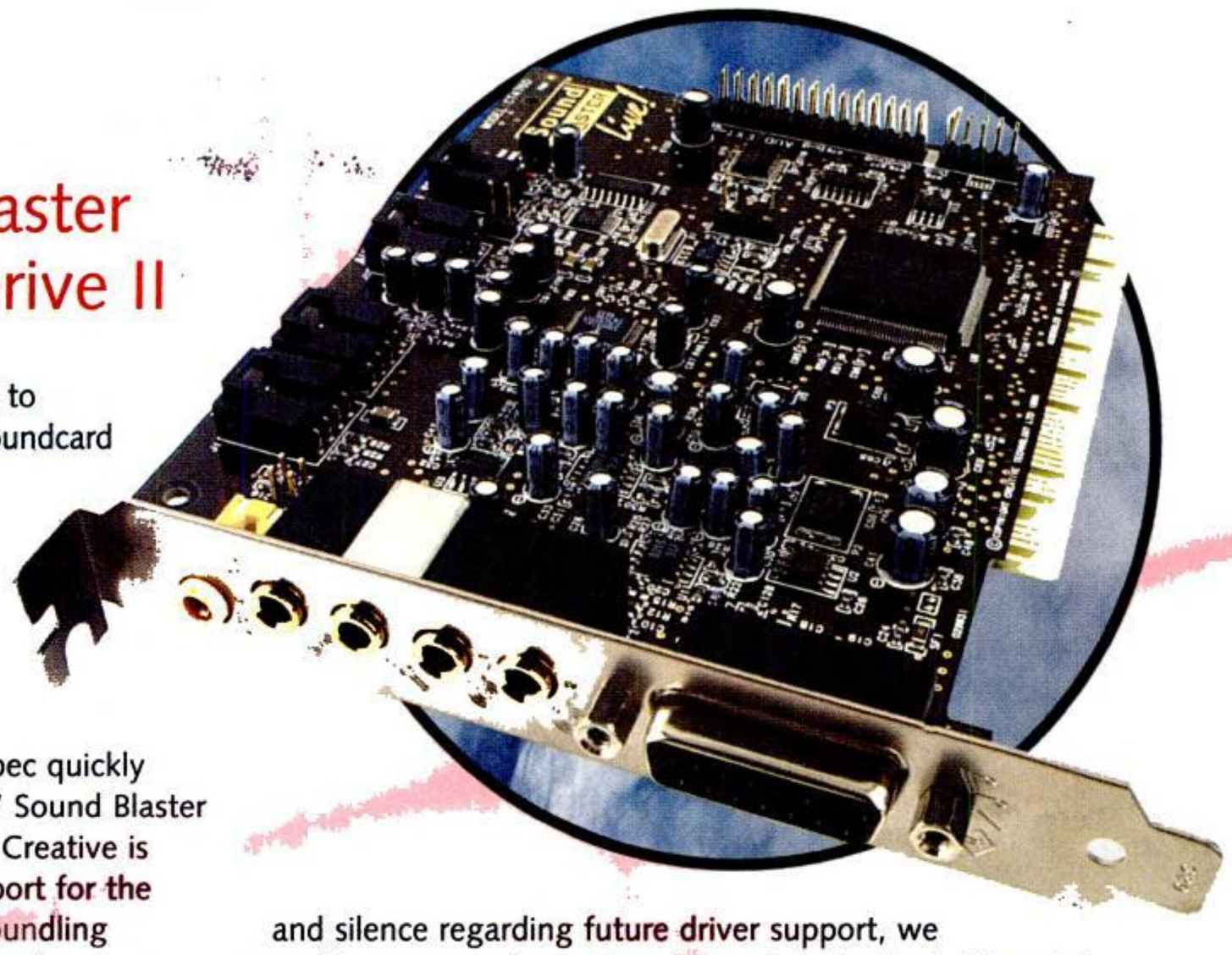
Download Socket free at **www.get-socket.com** and get hooked.

SOCKET

www.get-socket.com

Soundcard

Creative Labs Sound Blaster Live! Platinum + Live Drive II



$200, www.soundblaster.com

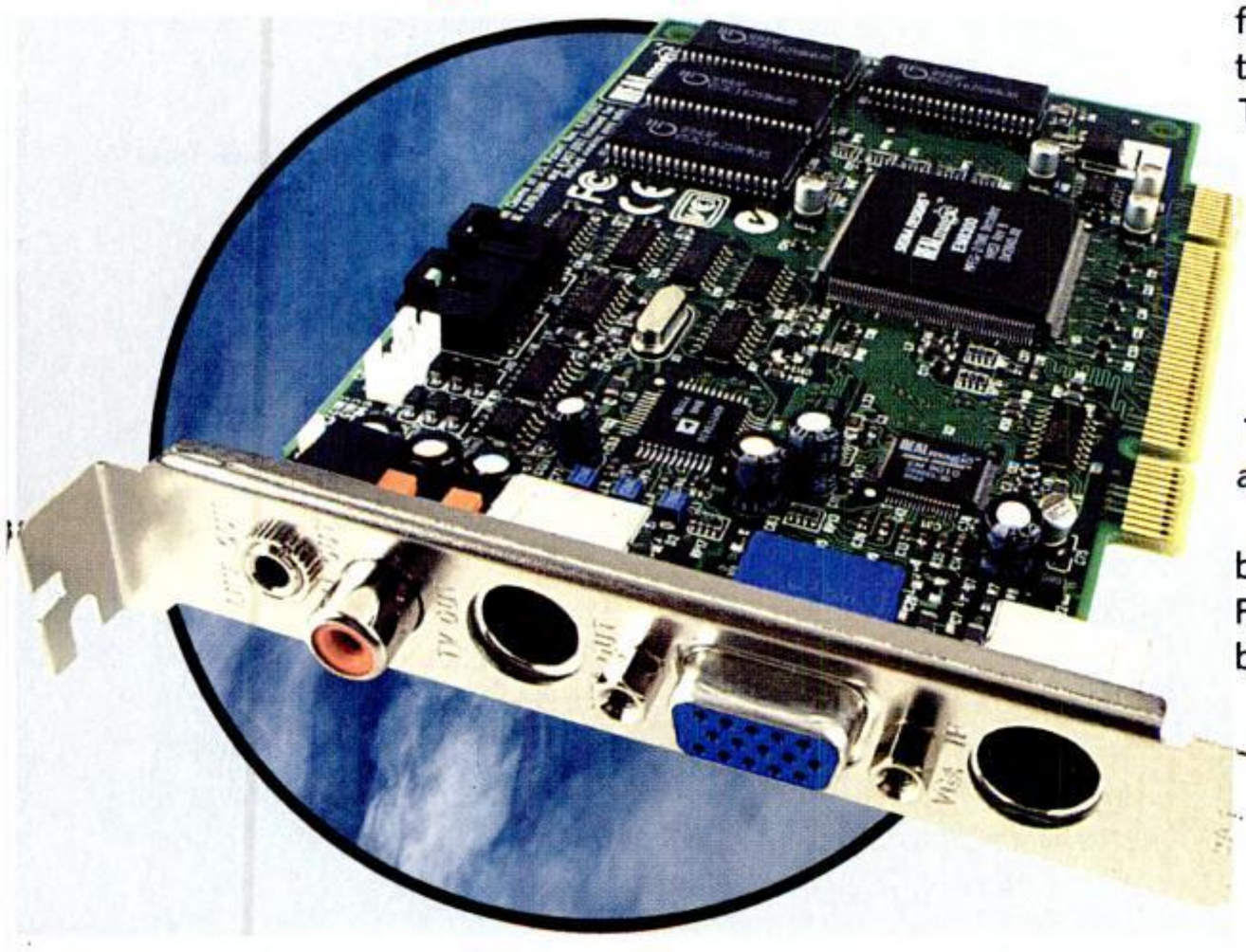
The Live! Platinum has effectively outclassed—not to mention outlasted—all competitors, making the soundcard decision a breeze for this year's Dream Machine. Featuring Creative's 10K1 audio processor, the Live! Platinum is a full-service soundcard offering a gaggle of front-mounted connectors (care of the Live Drive II, not pictured) for all your audio production needs. From gaming to sound editing, the Live! is a complete package.

Why We Chose It: With Aureal and its A3D spec quickly sinking into the technology tar pit, Creative Labs' Sound Blaster Live! stands above other hardcore gaming cards. Creative is diligent with driver updates, has widespread support for the EAX 3D-sound-effects API, and offers a host of bundling options, including the new Live Drive II. This second generation of the Live Drive adds optical I/O and two auxiliary I/O connectors. By itself, the Live Drive II costs $150, but owners of the Platinum can trade in their original Live Drives and buy the Live Drive II for $50.

Budget Alternative: It breaks our hearts to see Aureal go away, but considering the company's rocky financial situation and silence regarding future driver support, we can't recommend any Aureal-based products at this point. If you want to save a few bucks and buy a product that will still be supported in 18 months, invest in the X-Gamer or MP3 version of the Sound Blaster Live!. These cards are nearly identical to the Platinum, but come with different software and hardware bundles—and you can easily purchase I/O upgrades through Creative.

MPEG Decoder

Sigma Designs Real Magic Hollywood Plus



$70, www.sigmadesigns.com

We've been singing the praises of the Hollywood Plus for the past several years, and the decoder card still deserves its accolades. Simply put, the Hollywood Plus can turn your PC into a movie theater. It pumps out Dolby Digital 5.1 AC3 and DTS sound without the assistance of a soundcard, and plays DVD, MPEG-2, MPEG-1, and even VCD through any videocard. A hardware X-Y scalar allows for realtime window resizing and anti-aliasing, and supports resolutions all the way up to 1600x1200. For watching movies on your TV, the Hollywood Plus includes S-Video and Composite out, and uses a 10-bit video DAC that offers amazing image quality with no aliasing, sheering, or artifacting.

Why We Chose It: With its superb image quality, Sigma Designs' card is the defacto standard for MPEG decoding on the PC. The only real competitor it faces is Creative Labs' Dxr3—which just so happens to have an eerily similar design. There's also the Cinemaster MPEG-2 decoder, but it's only available in OEM systems.

Budget Alternative: There really is no budget alternative, because Creative's card costs $10 more than the Hollywood Plus. For DVD movies on a budget, you'll have to go with software-based DVD playback. Of course, you'll need a semi-burly CPU to run software-based DVD smoothly, but since you're a *Maximum PC* reader, we'll assume you're OK on the CPU-cycles front. Which software decoder is best? We like InterVideo *WinDVD* because of its intuitive controls, extensive hardware support, software downscaler, and ability to run well on a wide array of systems.

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CD-ROM

Plextor Ultraplex 40x Max

$120, www.plextor.com

Plextor's Ultraplex 40x Max is the best SCSI CD-ROM drive on the market, period. It offers maximum sequential read speeds up to 40x, and averages approximately 27x. Burst speeds top out at around 20MB/sec, and since the drive is SCSI, it can operate at peak speed without wolfing down precious system resources. Perhaps the most drive's attractive feature is its ability to extract audio at an astonishing 40x.

Why We Chose It: We didn't choose this drive because it's the fastest CD-ROM on the market—it isn't. For speed, look to Kenwood's 72x TrueX drive. We chose the Plextor because it's the fastest *SCSI* CD-ROM drive on the market, and because it offers rock-solid stability. And because we're pairing it with Plextor CD-RWs, we get the added benefit of bit-by-bit accurate disc duplication. That's right—Plextor's *DiscDupe* program allows you to make perfect replicas of any disc when using Plextor CD-ROM and CD-RW drives in tandem. This means you can make backups of everything from copy-protected games to Playstation discs, all without the fear of burning a tosser.

Budget Alternative: The best non-Plextor CD-ROM drive is the Kenwood 72x, but since it costs around $100, it's not really a "budget alternative." We're still going to recommend it, though, because there's no other drive we're willing to put our name behind.

CD-RWs

Dual Plextor Plexwriters

$400 per drive, www.plextor.com

Choosing dual Plexwriter 12/4/32 drives took us about, oh… three seconds. With 12x recording speeds, the latest Plexwriters are the fastest SCSI CD-RWs available. The decision to go with Plextor was easy because we're also using a Plextor CD-ROM, and Plextor-on-Plextor action lets you produce bit-by-bit accurate copies of games, audio CDs, and other forms of, ahem, "adult" entertainment.

Why We Chose It: This latest Plexwriter is the fastest SCSI CD-RW drive money can buy—capiche? And the only thing better than having one of these drives is having two. With the second drive and a copy of Padus *Diskjuggler*, we can simultaneously copy a single source CD to our two CD-RWs. Double-dipped duplication on the double.

Budget Alternative: Being on a budget precludes the use of the SCSI bus for worry-free CD mastering, so you'll have to take your chances with an IDE drive. At the risk of sounding like Plextor booty-kissers, we heartily recommend Plextor's Plexwriter 8/4/32, which rings in at $270. For a non-Plextor drive, we put our faith in the $350 TDK veloCD, which also boasts an 8/4/32 speed rating.

DVD-ROM

Pioneer DVD-115 16x

$170, www.pioneerusa.com

Just like the Plextor 12x SCSI drive, the Pioneer DVD-115 was a shoe-in. Pioneer makes the fastest DVD-ROM drives on the market, and the 16x DVD-115 rips all other drives to shreds during benchmarking.

Why We Chose It: The DVD-ROM decision pretty much took care of itself—benchmarking dominance and a reputation for reliability will win you a ticket to the show every year. Granted, 16x DVD-ROM speeds aren't really necessary, given the speed requirements of DVD-ROM movies and the scant supply of DVD-ROM software titles, but this is the Dream Machine, folks; real-world usefulness isn't a priority. The Pioneer drive's 40x CD-ROM read speed, however, is certainly fast enough to use in a pinch when our Plextor SCSI CD-ROM drive is in use.

Budget Alternative: Our pick for a budget DVD-ROM drive is the Pioneer DVD-114 10x, simply because it's the former champion. Amazingly, Pioneer's older 10x drive can cost almost as much as the 16x drive. Both can be found online for around $130, and if you're a savvy shopper, you can find the 10x drive for as low as $100.

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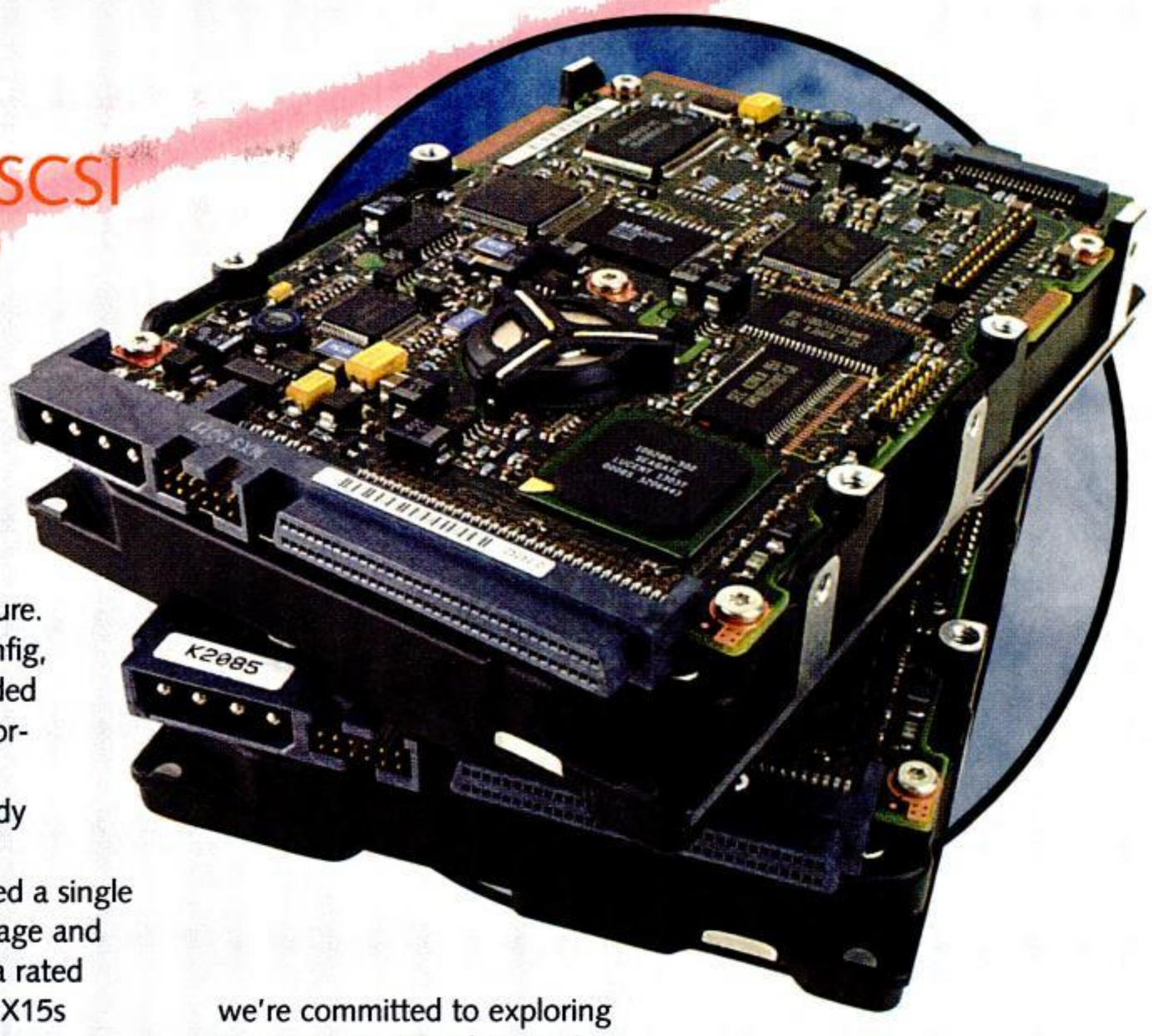
Hard Drives

Dual 18GB Seagate X15 SCSI drives, 75GB IBM 75GXP

$750 per each Seagate, www.seagate.com
$615 for the Deskstar, www.storage.ibm.com



We doubled our hard drive pleasure with two Seagate X15s. Spinning at an amazing 15,000rpm and running on the brand-spankin' new SCSI Ultra160 bus, the X15 hard drives have a rated seek time of 3.5ms, and claim an unprecedented 1.2 million hours of service before failure. We wanted to run the two drives together in a RAID config, but the Seagates just wouldn't cooperate with our intended DPT Decade RAID controller. We don't have enough information to put the blame on either hardware vendor, but we're confident that some kind of firmware fix will remedy the situation in due time.

We felt 36GB just wasn't enough, so we also included a single 75GB IBM Deskstar 75GXP (not pictured) for MP3 storage and other backup purposes. With seek times of 8.5ms and a rated transfer rate of 37MB/sec, the Deskstar gives even our X15s a run for the money in transfer rates along the inner edges of the platter. Unfortunately, this ATA/100 drive is paired with just an ATA/66 controller, care of the mobo's chipset.

Why We Chose It: The fastest SCSI hard drives used to run at 10,000rpm. With the X15 Cheetah, Seagate reduced the size of the platters and upped the spindle speed by 50 percent. This small change allows for the fastest transfer rates available on the desktop, and helps reduce power consumption, heat generation, and failure rates. We also chose the X15s because they're Ultra160 drives, and we're committed to exploring the cutting edge of technology.

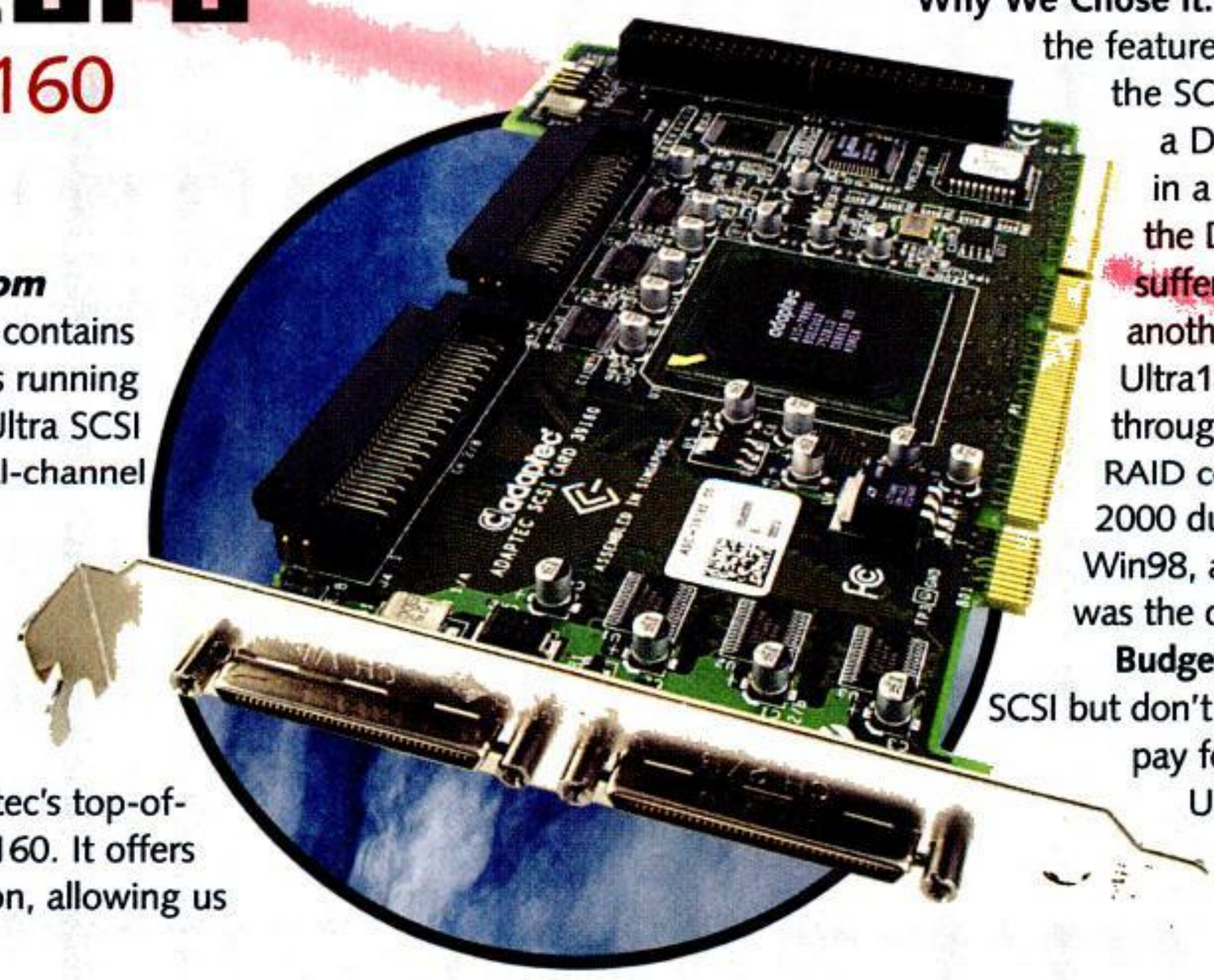
The 75GB Deskstar is the flagship of the IBM line, and its performance within the first 20GB of the platter eclipses even 10,000rpm SCSI drives. We chose it because it's both the largest and fastest IDE hard drive available.

Budget Alternatives: Check out the 40GB Maxtor DiamondMax Plus. We've seen it on Pricewatch.com for a measly $225. That's chicken scratch, considering its cavernous capacity and zippy 24MB/sec average read speed.

SCSI card

Adaptec 39160 Ultra 160

$350, www.adaptec.com



Since the Dream Machine contains different SCSI components running in two different flavors—Ultra SCSI and Ultra160 SCSI—a dual-channel card was imperative. To handle communication between the devices, and to ensure that our Ultra160 hard drives operated at peak efficiency, we chose Adaptec's top-of-the-line SCSI card, the 39160. It offers two channels of SCSI action, allowing us to place our magnetic and optical drives on separate channels to maintain peak throughput for each device.

Why We Chose It: The Adaptec's 39160 has all the features we need, and it's from Adaptec, the SCSI leader. Our original choice was a DPT Decade card to run our X15s in a RAID 0 config. Unfortunately, the Decade card and the X15s suffered an allergic reaction to one another, dashing our dreams of two Ultra160 hard drives striping away for extra throughput. Why not use another brand's RAID controller? Because Dream Machine 2000 dual-boots between Win2000 and Win98, and at press time, the DPT Decade was the only RAID card to support Win98.

Budget Alternatives: If you want Ultra160 SCSI but don't want to knock over a gas station to pay for it, check out Adaptec's budget Ultra160 card, the 19160. It supports up to 15 devices, costs only $150, and supports Win98 as well as NT.

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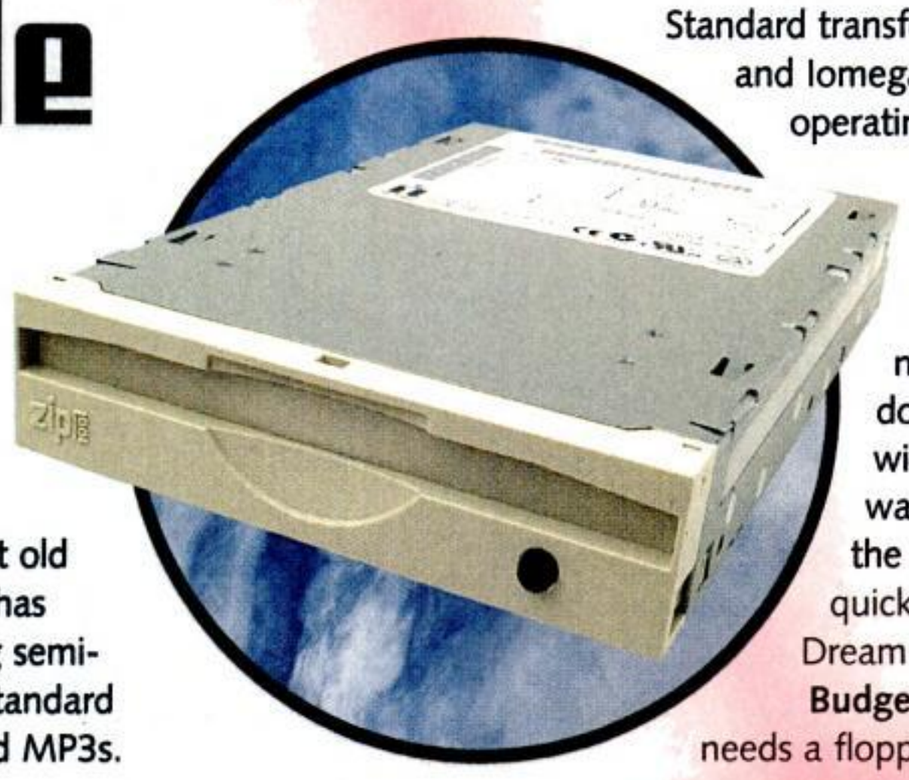
Removable Storage

Iomega Zip 100MB Internal IDE



$100, www.iomega.com

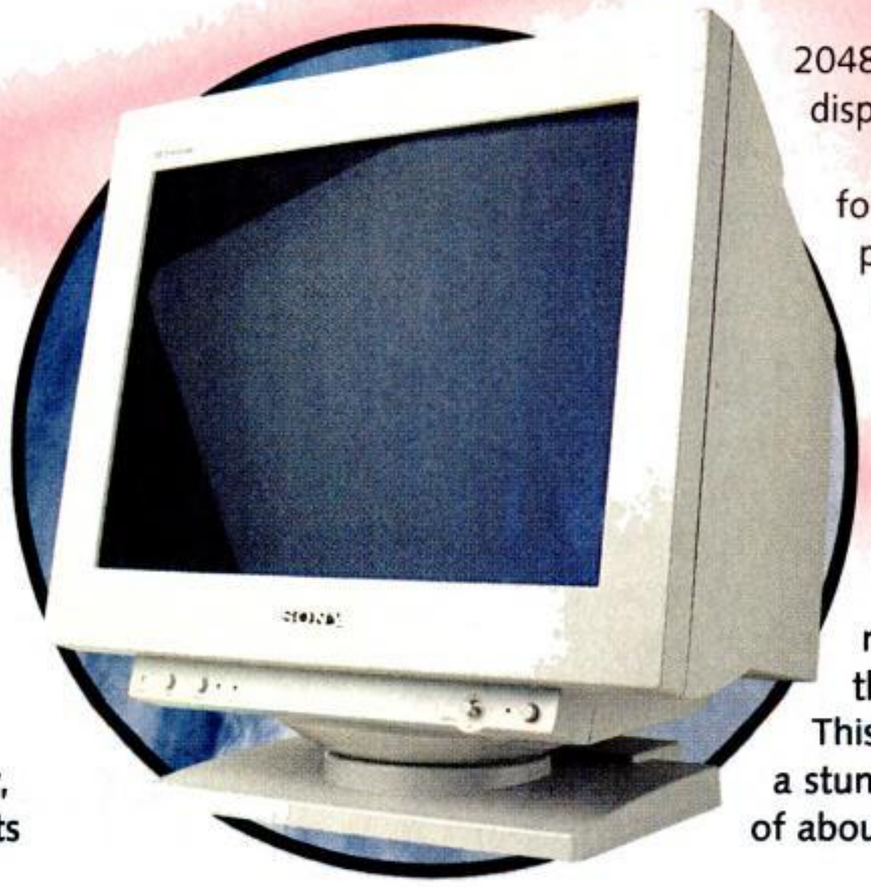
What would the Dream Machine be without old faithful? Iomega's trusty little Zip 100 drive has become the ubiquitous solution for shuttling semi-pudgy files around. At just $10 a pop, the standard 100MB media is perfect for JPEGs, AVIs, and MP3s. Standard transfer rates average about 1.3MB/sec, and Iomega's great software package returns operating system control to you while large files are transferring.

Why We Chose It: We have chastised every review system that lacked this simple necessity. Why not a Zip 250, you ask? Because it doesn't yet offer perfect integration with the Zip 100. While they're backward-compatible with Zip 100 media, the 250 drives don't read the 100s as quickly, and we wanted to keep our Dream Machine file transfers snappy.

Budget Alternative: Hey, every machine needs a floppy drive, if only for nostalgia's sake.

Monitor

Sony F500



$1,900, www.ita.sel.sony.com

For the love of God, will someone please engineer a better monitor than the F500! It's won our Gear of the Year award two years in a row, and now it's the display of choice for Dream Machine 2000. We'd like to pick another monitor for a change.

But whatcha gonna do? This 21-incher offers a gorgeous flat display, boasts a breathtaking 0.22mm grille pitch, and now, with an update to the F500 "R" model, hits 2048x1536 at a 75Hz refresh rate (the display does 1600x1200 at 85Hz).

Why We Chose It: We're suckers for the bright, vibrant color of Sony's patented aperture grille technology. And, pretty colors and screen flatness aside, this display's grille pitch really does make a difference when viewing high-res images. We've simply never seen finer detail in a CRT. Awesome!

Budget Alternative: If you really need to save some jingle, check out the Mitsubishi Diamond Pro 900u. This 19-inch aperture grille CRT offers a stunning flat screen for a street price of about $600.

Speakers

Klipsch ProMedia V.2-400

$250, www.klipsch.com

With 400 watts of power and THX certification, the Klipsch are in a class all by themselves. In fact, unless you plan on buying a set, don't listen to the Klipsch ProMedia, because you'll be spoiled. If you see a set in your local electronics store, either turn around and run or pass by them with your hands over your ears, singing, "La-la-la-la...I CAN'T HEAR YOU, KLIPSCH!"

Why We Chose It: The Klipsch received a perfect 10 verdict in our January issue, and have yet to be beaten during listening tests in the Lab. Some speakers cost the same as the Klipsch, but sound worse. Other speakers sound almost as good, but cost more. No competitors have matched the Klipsch incredible price-to-power ratio. The only real contender is the Videologic Scirocco Crossfire, which received a 9 verdict in July. The Crossfires sound fantastic, but lack the clarity at high volume delivered by the Klipsch, and cost $150 more.

Budget Alternative: For just $100, the Monsoon MH-500s sound as good as systems that cost twice as much. By mating 2.5-inch cones with dipole-radiating magnetic flat speakers, the MH-500s achieve a unique look, as well as impeccable sound reproduction. The 17-watt woofer may sound a bit wimpy, but it's perfectly matched with the satellites. Dollar for dollar, there's no better speaker system in that price range.

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Keyboard

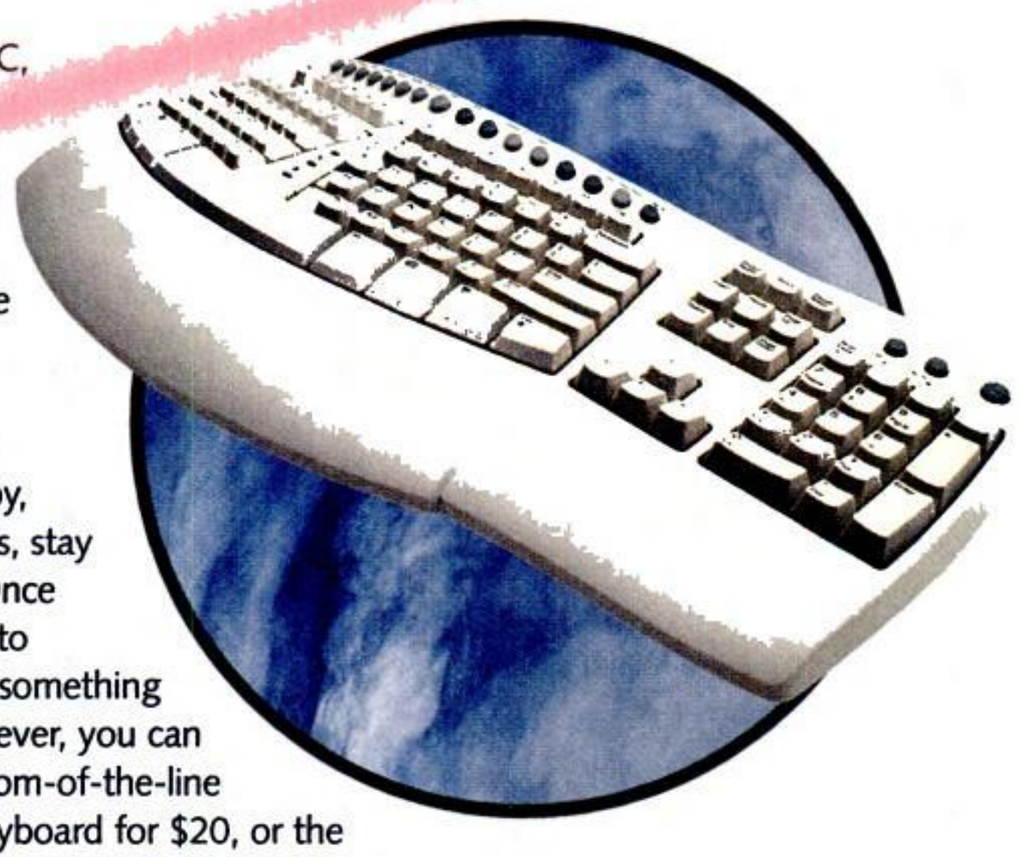
Microsoft Natural Keyboard Pro USB

$75, www.microsoft.com/hardware

Choosing a keyboard is a very personal decision. Everyone's hands are different, so the right keyboard is always the one that feels best to you. And to the majority of our staff, the one that feels best is the Microsoft Natural Keyboard Pro. It's the crown jewel of Microsoft's stellar ergonomic keyboard line, boasting 19 hot keys, two USB ports, and an ergonomic shape that immediately feels comfortable.

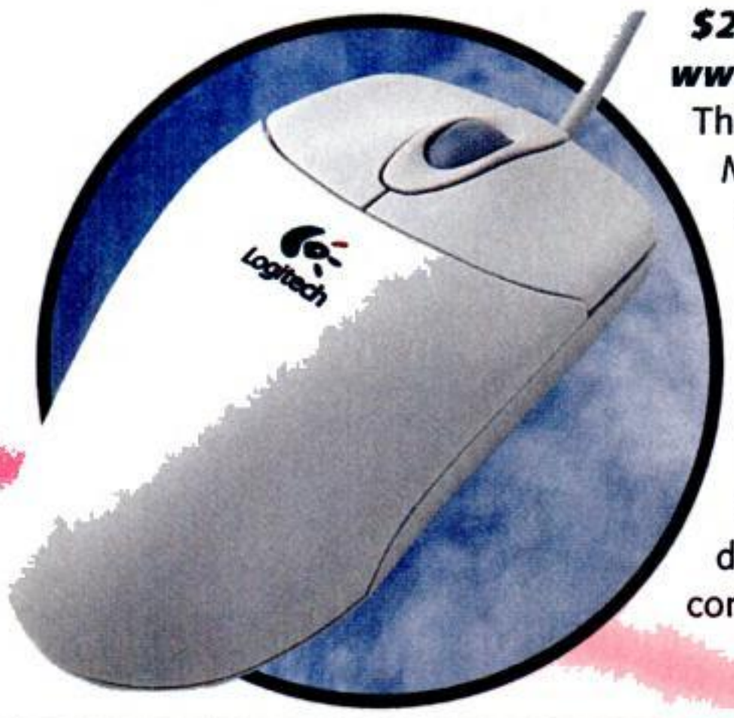
Why We Chose It: It felt right, and we liked the vast number of hot keys.

Budget Alternative: Most people use the keyboard that comes with their PC, or buy one for $15 at CompUSA. If you're one of these keyboard bottom feeders and you're happy, by all means, stay that way. Once you decide to upgrade to something better, however, you can snag a bottom-of-the-line Logitech keyboard for $20, or the baseline Microsoft Natural keyboard for only $45.



Mouse

Logitech First Mouse Wheel



$20, www.Logitech.com

The Logitech First Mouse Wheel may look like a regular old mouse, but subtle nuances make this varmint an excellent tracking device. Its smooth, svelte design makes it comfortable for a wide array of hand sizes, and its ambidextrous shape fits lefties and righties. It supports USB and PS/2 connections, and has a crisp clicking action and a responsive scroll wheel.

Why We Chose It: Though a more extravagant mouse, like the Razer Boomslang or the Microsoft Intellimouse Optical, may seem more fitting for a monster rig like the Dream Machine, the truth is that those mice simply aren't sufficiently well-rounded for everyday use. The Boomslang is too big for extended comfort, and the Optical's Intellieye technology is sketchy. Some staffers prefer the regular Microsoft Intellimouse, but the fact that it's made exclusively for right-handed people cost it the nomination.

Budget Alternative: Considering that the Logitech mouse is only $20, there isn't much by way of a budget alternative. Every mouse needs a scroll wheel for selecting weapons in games or scrolling web pages, so we're not willing to recommend a cheaper, wheel-less alternative. Also, $20 is the bottom line for most mice, so any model you may find for less will most likely be unreliable, uncomfortable, or unwieldy.

Case

PC Power and Cooling Solid-Steel Tower

$279, www.pcpowerandcooling.com

With all of its drive bays stuffed full of hardware, the Solid-Steel Tower is an obscene monument to PC power. Featuring eight full-size external drive bays, the Solid-Steel's most redeeming quality is, well, its quality. It doesn't flex when you push it, and weighs 40 pounds without any components inside.

Why We Chose It: ASLab's Full Tower case was a close contender. But while it offers better cooling, the ASLab case lost to the Solid-Steel because it doesn't have enough external drive bays. We also wanted to pair the Solid-Steel Tower with PC Power and Cooling's Turbo-Cool 425 power supply. Our dual 15,000rpm SCSI hard drives, additional 7,200rpm IDE drive, dual procs, dual RIMMs, and four optical drives made a mere 300 watts seem insufficient.

Budget Alternatives: Not everyone needs to suck down five open drive bays. If you don't, we recommend ASLab's Full Tower Case (**www.aslab.com**). It features two massive 13CM fans and a vented cage for a hard drive stack. Even cheaper is Supermicro's SC760A, a beefy case that gets you in the power users' club without making you pay through the nose.

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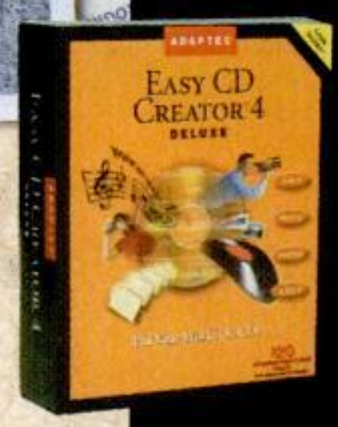
CD RECORDING

BEYOND THE ORDINARY

Upgrade to the Deluxe edition of Easy CD Creator™ 4 and greatly expand your CD recording capabilities

The software bundled with your CD-R/W drive has capabilities that are - well, kind of ordinary. But with a simple upgrade, you'll step way beyond everyday CD recording. Record from analog sources like records and cassettes. Download MP3s from the Web. Put photos and videos on CD. And not just record, but enhance them - with your own edits and special effects. You can even use features like Take Two™ to back-up your entire hard disk in 3 easy steps, giving you the tools to quickly recover from crashes or virus infections. Open up a new world of CD Recording with an upgrade to Adaptec's Easy CD Creator™ 4 Deluxe and finally realize your CD-R's full potential. Available from your local retailer or contact us at 1-800-442-7274.



Visit www.adaptec.com/easy3

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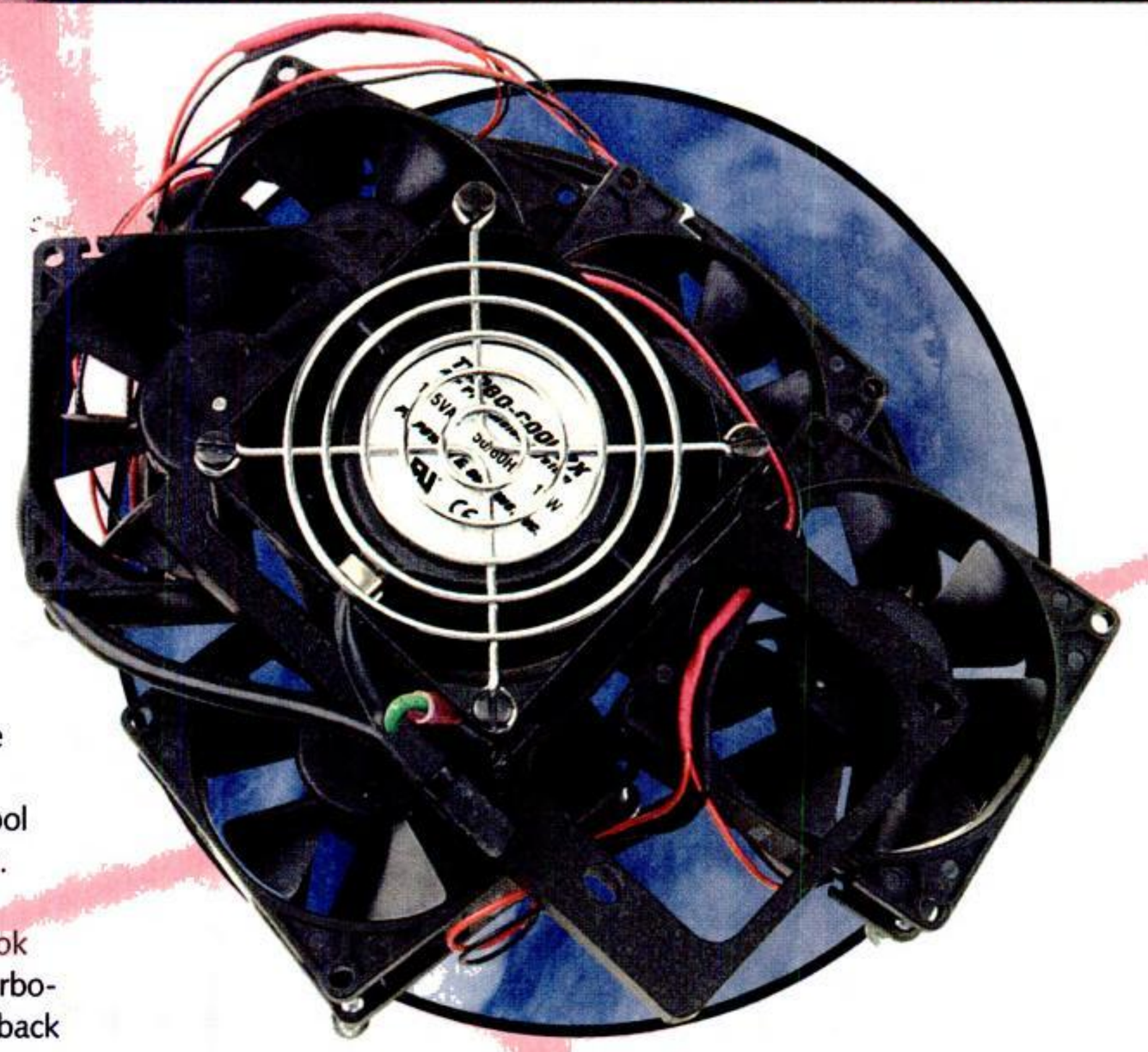
Cooling

Three Standard 80mm Auxiliary Ball-Bearing Fans, Two Silencer 80mm Cooling Fans, One Turbo-Cool 2x air propulsion system



$110 total, www.pcpowercooling.com

Our box full o' hardware needed some serious active cooling—six strategically placed, high-speed fans, to be precise. Two were mounted low in the front to suck air into the box. Two were mounted high in the rear to exhaust heat. A fifth fan sucks in cool air from outside and blows it across the two Seagate hard drives. (Seagate says the 15,000rpm drives create a little less heat than the 10,000rpm drives, but they still generate enough heat to cook a country breakfast.) We also added PC Power and Cooling's Turbo-Cool system. Essentially a high-speed fan that you screw to the back of the power supply, it's intended to compensate for any air restriction that a power supply encounters because of its closed mesh.

Unfortunately, we didn't have enough time to implement our ultimate cooling plan: the dual heat pipe. A heat pipe wicks heat away from a hot object and transfers it through a gaseous or liquid substance to outside the machine, where it's dissipated. Scott Tarr, our online editor, is licensed to buy and handle freon refrigerants, and in a future issue, he'll introduce us all to some heat pipe madness. Brrr! We're cold already!

DV & Gaming

Hey, there's *always* room for improvement. If we were to fine-tune DM2K for DV production and gaming, we'd add the following:

DV: The $1,000 Pinnacle DV500 FireWire capture card offers dual-stream operation for realtime DV editing, and its codec saves streamed video in native MPEG-2 format for authoring to DVD. The package also comes with a special version of Adobe *Premiere*, *Photoshop LE*, and other goodies for 3D transitions and TV-quality titling. For our dream DV camera, we choose the Canon XL-1. With three CCDs for broadcast-quality filming, ultra-low-light shooting abilities, and interchangeable lenses, this puppy can chew through anything you want to shoot. The basic package starts at $3,500.

Gaming: First, we'd go dual-monitor, adding the $2,000 Princeton Graphics 32-inch AR3.2T. This towering display might only hit 1024x768, but that's all you need to play your favorite games in their finest detail. Trust us, fragging chum on the Princeton kicks buttocks over any experience that TV-out on a big-screen TV can offer. Even the finest TV-out hits a ceiling of 800x600, and TV monitor refresh rates hit a brick wall of 60Hz, which means frame rates top out at 60fps as well. We'd run the Princeton off of the 64MB GeForce 2 card, then install a Voodoo 5 5500 PCI to play Glide games through the Sony GDM-F500.

Next we'd slip an Everglide Giganta Attack pad under our Logitech mouse for extreme fragging accuracy. If you think all mouse pads are the same, you've obviously never sampled one of these puppies. For our joytsick, we'd opt for the Logitech Wingman Force. Its large footprint ensures it won't slip off the desk during extreme maneuvers.

Shopping List

For the first time in Dream Machine history, we eliminated an arbitrary price ceiling designed to keep the box "affordable." So just how much does Dream Machine 2000 cost? Ack! Even we were shocked by the final tally...

CPUs (2)	$2,200
Mobo	$330
RIMMs (2)	$1,980
Videocard	$400
Soundcard	$200
MPEG2 Decoder	$70
CD-ROM	$120
CD-RWs (2)	$800
DVD-ROM	$170
Hard Drives (3)	$2,115
SCSI Card	$350
Zip	$100
Monitor	$1,900
Speakers	$250
Keyboard	$75
Mouse	$20
Case	$279
Cooling	$110
Win98	$209
Win2000	$219
	$11,987

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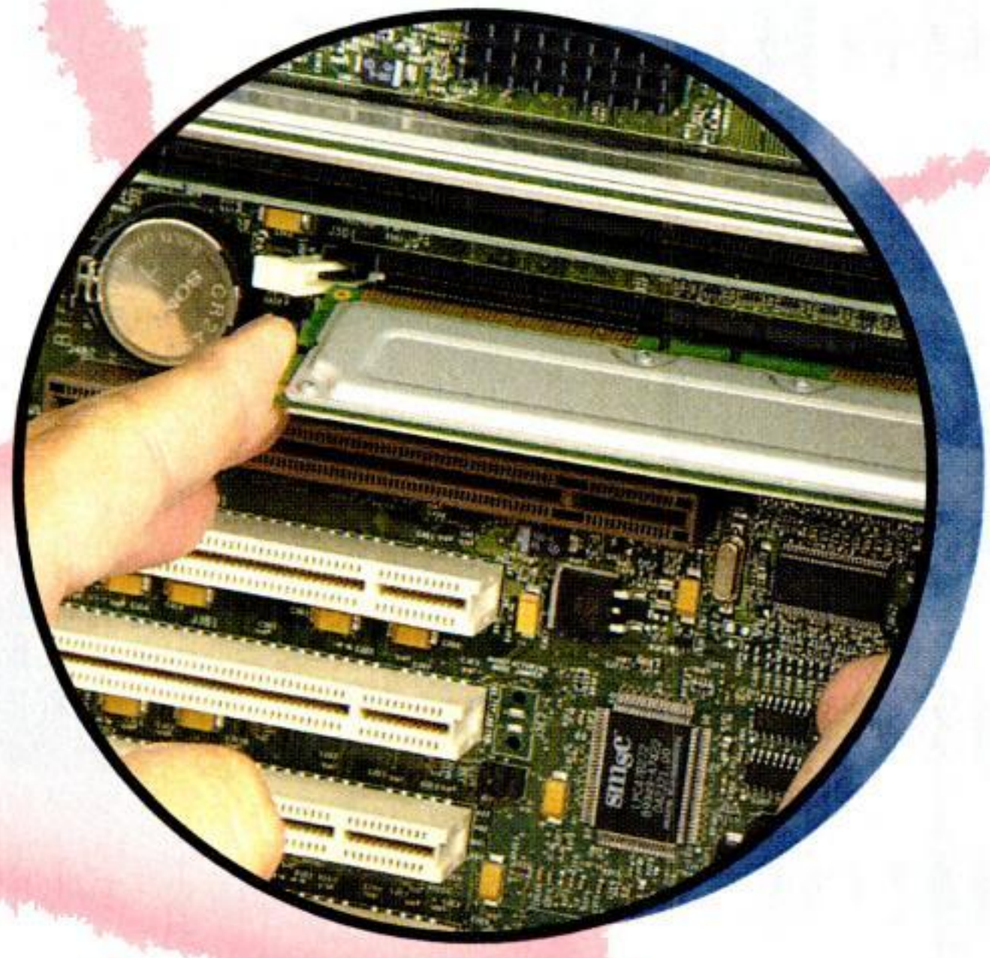
The Making Of DM2K

An Insider's Look

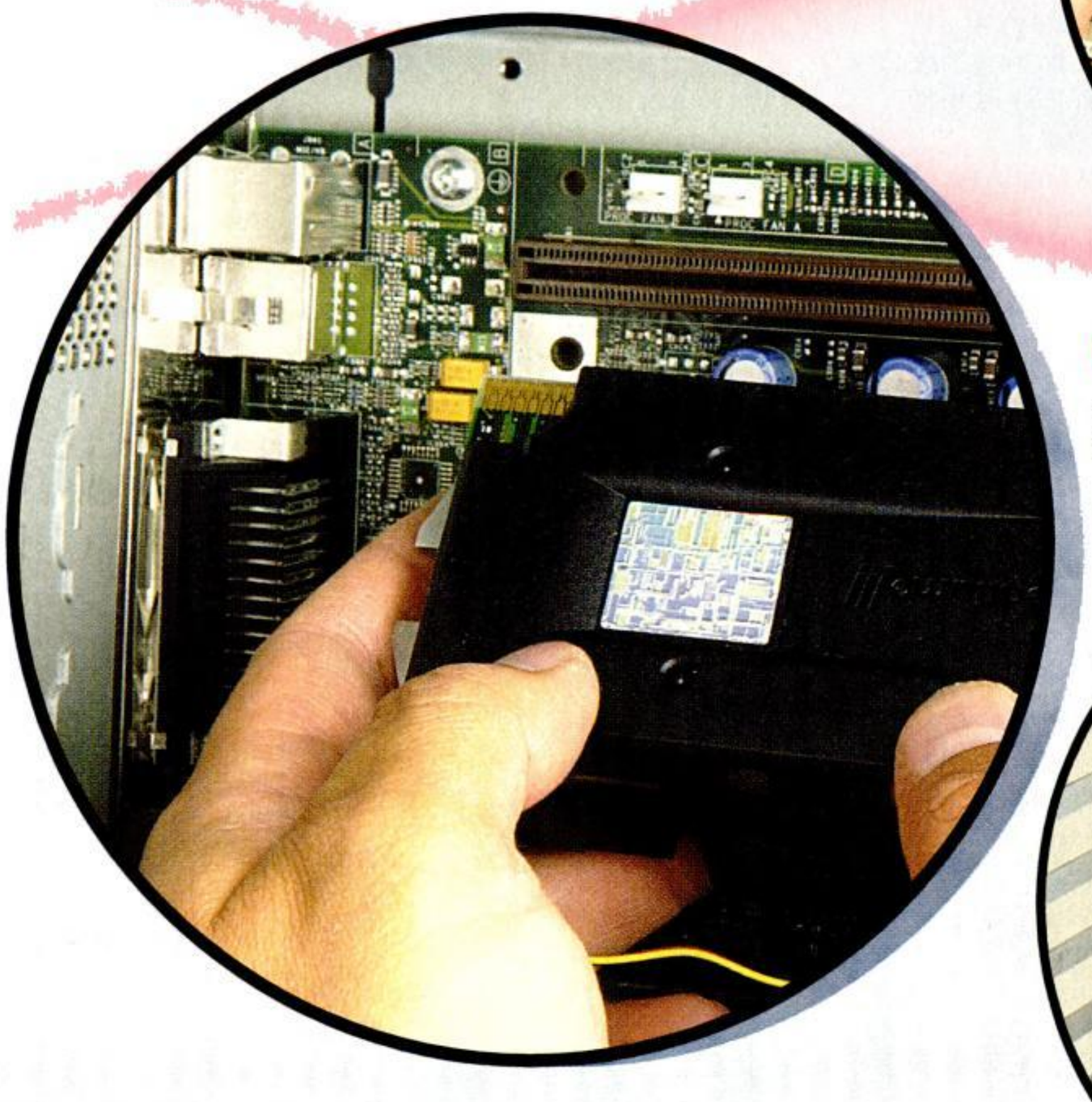
As we flipped the power switch on Dream Machine 2000 and listened to the fans and hard drives spooling up, we couldn't help but think about the rumble and sweet exhaust you inhale when you turn over the ignition of a restored big block muscle car.

Indeed, while we now know that system OEMs do more than simply screw parts together, a PC that you buy will never give you the same satisfaction as one that you've built on your own. You spec it out, you buy the parts, you build it yourself—it's your baby. We take similar pride in this year's Dream Machine, and we're happy to present some of the highlights of building it.



Careful...Careful...

The 840 chipset's dual memory channels require that you install two separate RIMMs, one into each channel.



Plugging in the Copper

Though you're no longer required to use matched CPUs when building an SMP rig, we still recommend it.

Do you have that in blue?

Don't be confused because the slot is longer than the card. The OR840 features the longer AGP Pro 50 slot, but is backward compatible with AGP 2x and AGP 4x cards.

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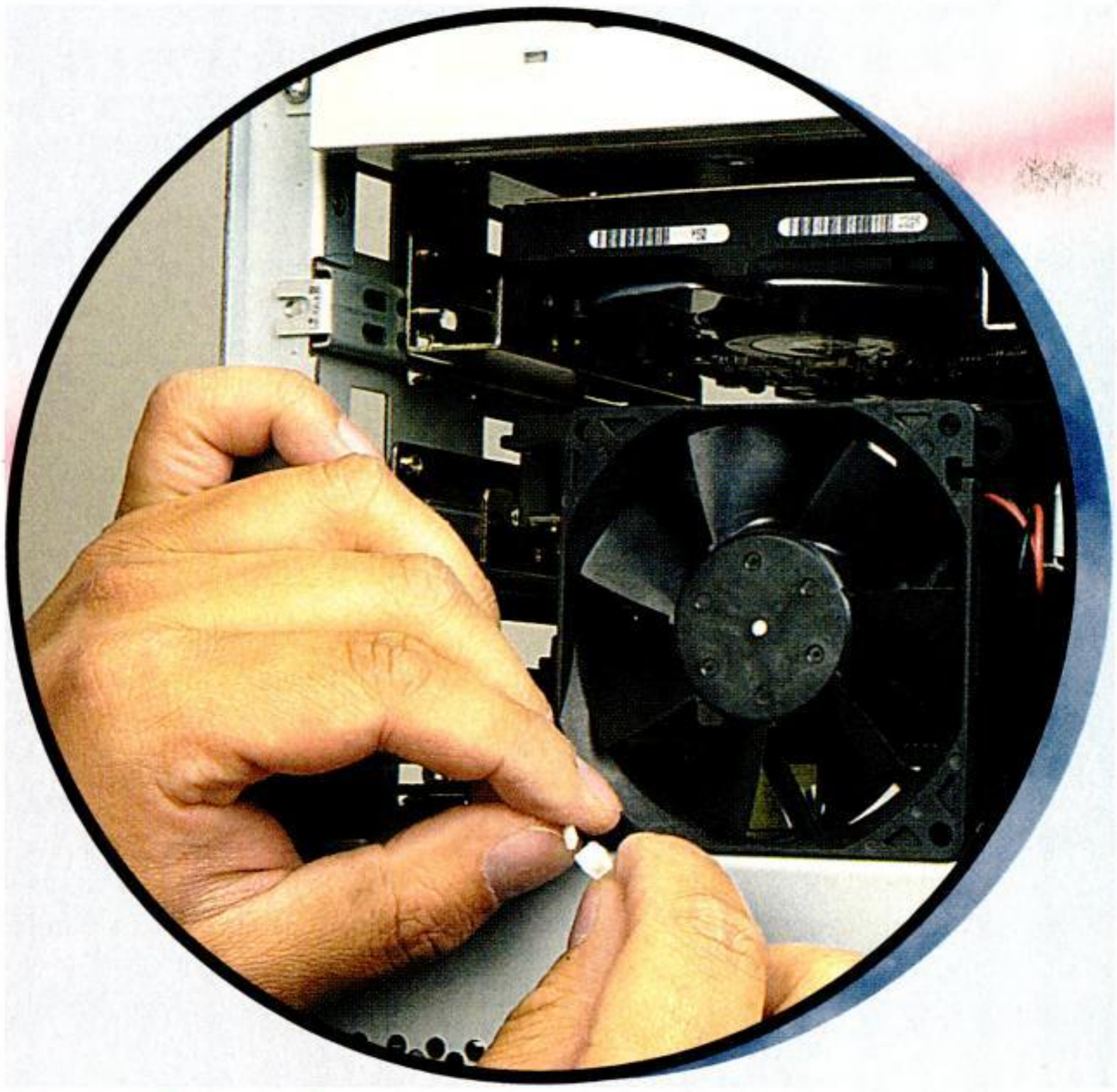
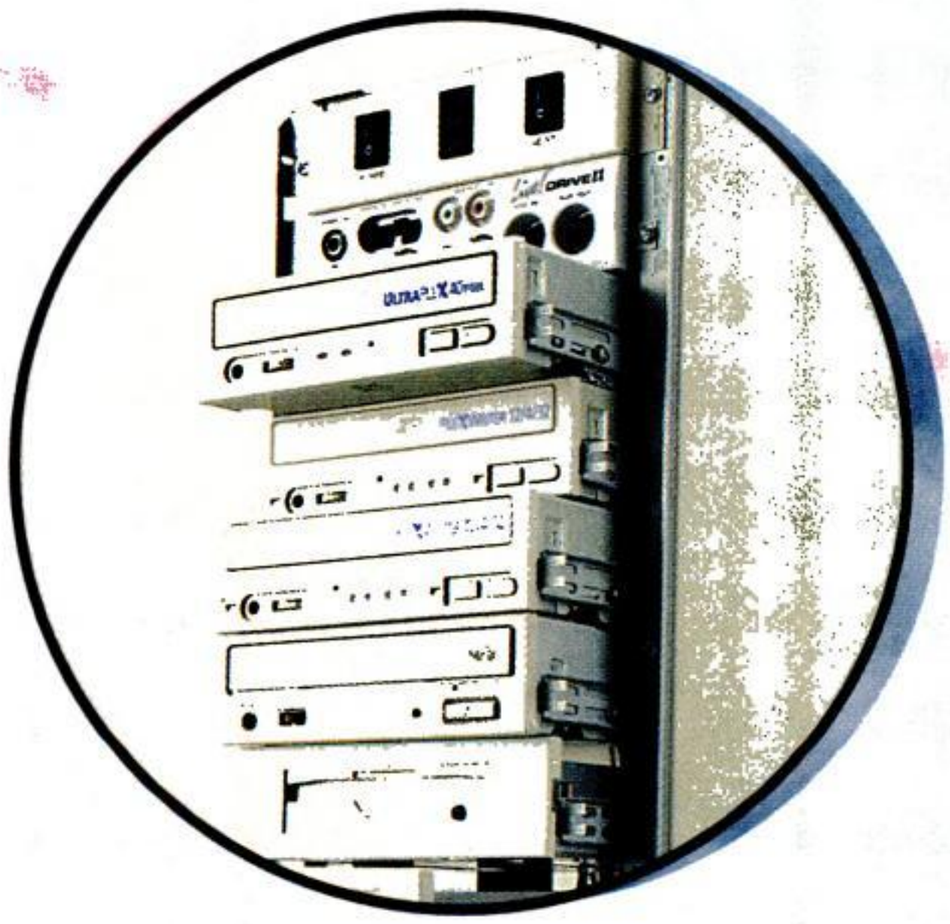


Put that platter on ice

Heat can warp hard drive platters and degrade life and performance. You definitely want to cool a 15,000rpm drive, and maybe even your 7,200rpm drives.

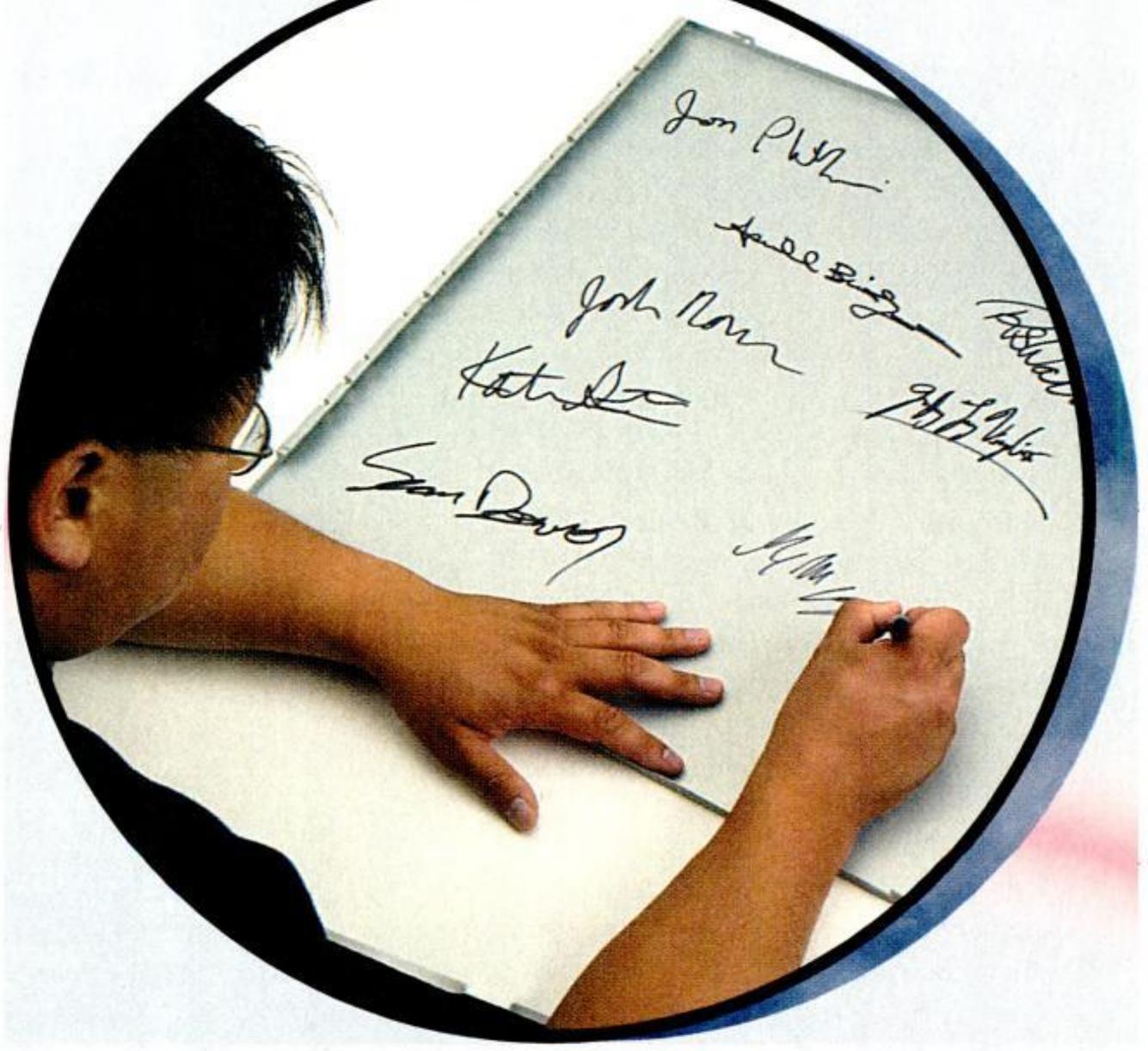
Ready retro rockets!

This nifty Turbo-Cool 2X mounts on the outside of your case and helps increase air flow through your power supply, lengthening its life and the life of your system.



Rails are righteous

Drive rails are a pain to set up, but once they're installed, they make replacing a drive or resetting a jumper a snap.



Signed, sealed, and delivered

With Dream Machine 2000 completed, we signed its case panel and dreamed of what may come next year.

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Performance

Awesome. Simply awesome.

Dream Machine 2000 is the fastest PC we've ever tested. It absolutely demolished most of our Lab benchmark records, and showed superlative performance across every sub-system.

To quantify our love child's power, we ran the Dream Machine through a gamut of benchmarks in both Win98 SE and Win2000 Professional in SMP mode. In the chart below, we publish the highest scores the box achieved, and note which operating system was used for each test.

In the *bootMark* test, the Dream Machine nailed 500 points exactly. That's 9 points higher than other 1GHz Pentium III-based machines we've tested, and a massive 60 points higher than the 1GHz "classic" Athlon Alienware system we reviewed in July. But the Dream Machine's *bootMark* record lasted less than five days—a Thunderbird Athlon system scooted into the Lab at the last minute, and broke the Pentium III's *bootMark* stranglehold. We believe that the Thunderbird's use of mutually exclusive cache (see page 56) allows the processor to contain the entire *bootMark* test in cache, thus picking up phenomenal points.

Keep in mind, though, that the *bootMark* is a small, synthetic benchmark that tests only raw integer power; it's definitely not the best gauge of real-world performance. For a truer view of how a system will perform in the real world, you must turn to *SYSmark2000*. And that, friends, is where the Dream Machine 2000 laid down the law.

SYSmark2000 runs action scripts through 12 real-world applications—such as Adobe *Premiere*, Microsoft *PowerPoint 2000*, and *CorelDRAW 9.0*—and records how long it takes for each script to finish. It then spits out a cumulative score (higher is better). Using both its procs in Win2000, Dream Machine 2000 smashed through the 200-point barrier, hitting 239. A single-proc 1GHz P-III machine hit 189, a 1GHz classic Athlon machine hit 170, and the 1GHz Thunderbird-based Polywell system reviewed on page 70 hit 191. The Dream Machine even blew away AMD's 1.1GHz Thunderbird reference system by almost 30 points. How did Dream Machine 2000 muster so much performance? We chalk it up to the dual CPUs, and gobs of PC800 Direct RDRAM running in dual channels.

In *HD Tach*, our hard drive benchmark, the Dream Machine displayed stunning performance when chewing through just one of its three hard drives. It seems the Seagate Cheetah X15 can hit an average read speed of 35.7MB/sec. The only machine to best the Dream Machine in this particular test is this month's Polywell system, which hit an average read speed of 38.6MB/sec. That's a respectable score indeed, but remember: We used only a single drive, and our Cheetah X15 still hit an incredible burst rate of 83.1MB/sec. The Polywell used two IBM Deskstar 75GXP drives in an ATA/100 RAID configuration. And there was no comparison in access times, as the 15,000rpm X15 drive kept random head seeks to an astounding 6.6ms, or half that of most EIDE drives.

In our Adobe *Photoshop 5.5* test, the Dream Machine's dual procs and dual-channel Direct RDRAM made our box the first PC to finish in less than 100 seconds. A 1GHz classic Athlon system took an additional 48 seconds to complete the same script.

The Dream Machine outpaced the competition—but only marginally—in our Direct3D test. In the D3D-specific *3DMark2000* run, the Dream Machine scored 67.2fps—about four frames faster than Athlons of any creed or color. Against 1GHz P-III systems outfitted with the older GeForce cards, we pulled away by about 10fps. Our single D3D benchmark is really a test of the AGP card, its drivers, and their implementation of AGP, so we didn't expect much of a boost. We did see fairly big gains, however, in the default *3DMark2000* benchmark. It's not one of our official tests, but the Dream Machine did manage to hammer out 6,623 3DMarks—about 300 more than the Polywell's 1GHz T-bird/GeForce 2 combo. We believe our smokin' Hercules videocard and its 64MB of memory made a mockery of the Polywell's 32MB card. Some performance may also be attributed to the 840 mobo's implementation of AGP 4x, and the greater memory bandwidth provided by dual-channel Direct RDRAM.

In *Quake III*, the Dream Machine again took honors, with a score of 75.4fps. This score just edges out other 1GHz machines armed with GeForce 2 cards. Just remember that *Quake III* is a videocard breaker, not a CPU breaker.

Unfortunately, our standard suite of benchmarks can't adequately illustrate the power of dual processing, which allows you to simultaneously run multiple applications without suffering a crippling performance hit. So to make a point, we also ran SiSoft *Sandra Pro*, a basic CPU benchmark that can take advantage of two processors at once. The Dream Machine, with its dual 1GHz CPUs, scored 4,510 MIPs and 2,641 MFLOPs. Meanwhile, AMD's awesome new 1.1GHz T-Bird reference box hit just 3,064 MIPS and 1,531 MFLOPs.

SYSmark2000, *Photoshop*, and *Quake III Arena* were run in Windows 2000 and took advantage of dual processors. All other tests represent performance in Win98. *HD Tach* was run on Seagate Cheetah. *CDTach* was run on Plextor CD-ROM drive.

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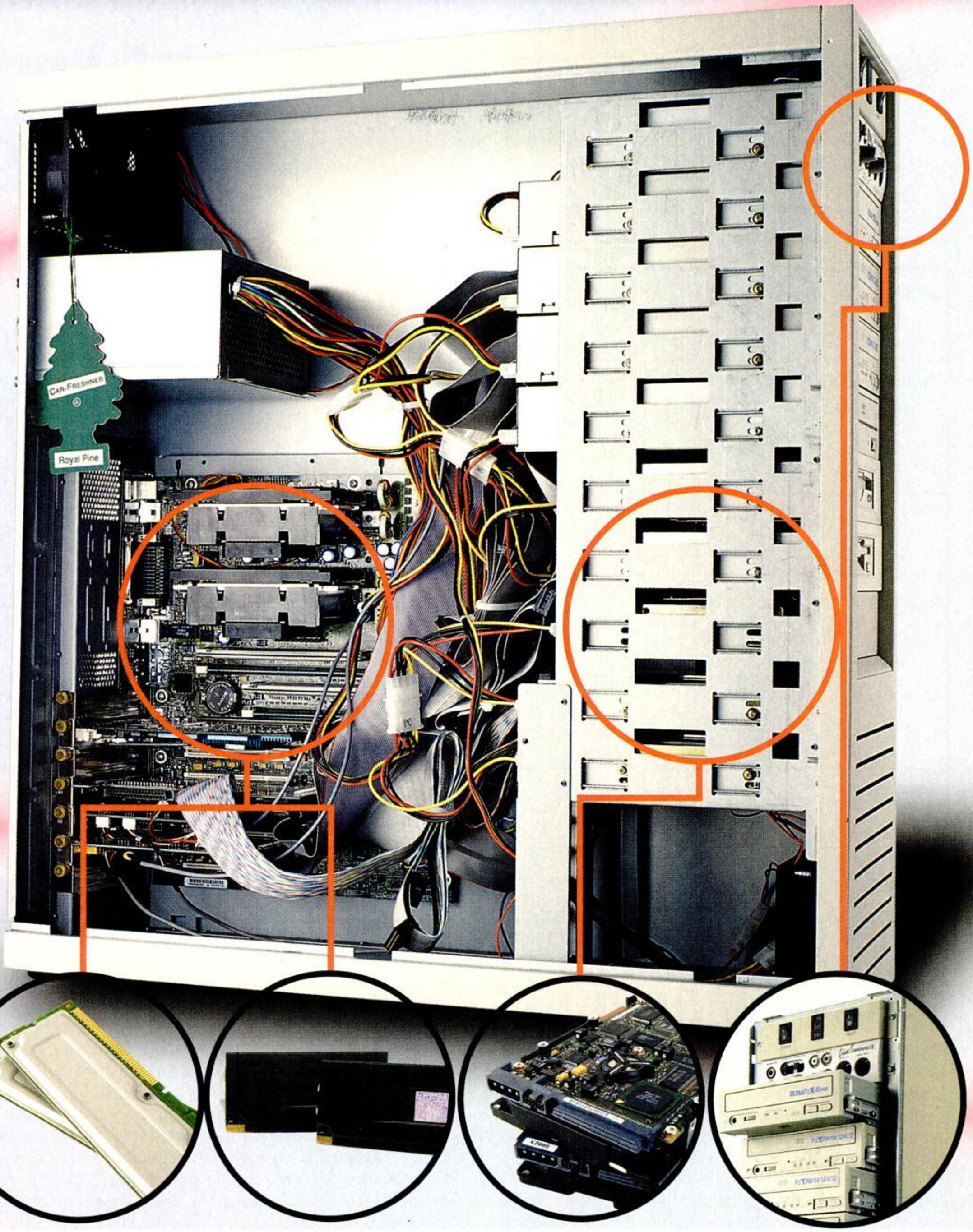

Board the Rambus Our mobo's claim to fame is its ability to use dual-channel Direct RDRAM memory for 3.2GB/sec throughput.

Dual Gigglehertz Nothing can whip Windows 2000's bloated body more into shape than two 1GHz Pentium IIIs kicking its fat ass up the stairs.

30,000rpm Hard Drives OK, they're not really 30,000rpm hard rives, but these two 15,000rpm Cheetahs offer awesome performance.

My Name is I/O Galore Creative Labs' Live Drive II offers more plugs than we can think of: both optical ports, RCA aux-in, and S/PDIF.

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Ye Olde Dream Machines of Yore

Four years ago, we wet our pants over the parts that went into Dream Machine '96. Today, we wouldn't feel comfortable giving that dusty collection of antiques to our grandmas.

A look back through Dream Machine history reveals just how far PCs have come. Today's 1GHz CPUs and 15,000rpm hard drives would have been classified as national security risks four years ago. You want nostalgia? Take a gander at the highlights below.

	1996	1997	1998	1999	2000
CPU	200MHz Pentium	300MHz Pentium II	400MHz Pentium II overclocked to 450MHz	500MHz Pentium III*	Dual 1GHz Pentium IIIs
Motherboard	FIC PT-2003 based on Apollo-VP chipset	AIR P6-KDI Dual Slot 1 based on 440LX chipset with onboard UW SCSI	Tyan Thunder 100 Dual Slot 1 based on 440BX chipset with onboard LAN, UW SCSI	Abit BX-6 R2 based on 440BX chipset	Intel OR840 based on 840 chipset with onboard LAN
Memory	32MB EDO RAM	64MB SDRAM	128MB PC100 SDRAM	128MB PC100 SDRAM	512MB dual-channel Direct RDRAM
Hard Drive	2.1GB Quantum Atlas with Adaptec 2940UW	4.3GB Micropolis Stinger UW SCSI	9GB Seagate Cheetah UW and 75GB IBM	18.2GB Quantum Fireball Plus KA	Dual 18GB Seagate Cheetah Ultra 160s Deskstar
Videocard	4MB Matrox Millennium	4MB ATI All-in-Wonder and 4MB Diamond Monster 3D	16MB Matrox Mystique G200 and 12MB Canopus Pure 3D II	32MB Matrox Millennium G400Max	64MB Hercules 3D Prophet II
Soundcard	Creative Labs Sound Blaster AWE32	Diamond Monster Sound	Turtle Beach Montego A3DXstream	Diamond Multimedia MX-300	Sound Blaster Live! Platinum
Monitor	Nanao T2-17TS	19-inch ViewSonic Optiquest V95	19-inch Sony GDM-400PS	No monitor included	21-inch Sony F500

* Our Dream Machine 99 feature focused on general system building, not ultimate performance. A 600MHz P-III was available at the time of publication.

Dream Machine 2001: a PC Odyssey

What will Dream Machine 2001 include? Difficult to say, but we'll hazard a few predictions that you hopefully won't remember 12 months from now.

Next year's videocard will have gigapixel fill rates and a ridiculous number of texture units, which means incredibly flexible rendering tools that will more accurately transform a game designer's imagination into awesome 3D games. The name of the game next year is programmability. Along with the ability to chew through intricately detailed and meticulously animated models, next year's hardware will be capable of astonishing pixel shader tricks that more realistically mimic complex materials such as velvet, wood, and concrete.

We expect that by September 2001, we'll push 2GHz of CPU power into a socket-based, 32-bit, x86 chip. Whether it's from Intel or AMD, only time will tell. Next year's rig will run about 256MB of PC2100 DDR SDRAM, or 256MB of Direct RDRAM at quad rates. The hard drive will likely spin at 15,000rpm but will pack denser platters, yielding greater performance and capacity in an Ultra 320 configuration. If we stick with a backup drive, a 200GB ATA drive will likely hold every MP3 in the world, but will continue to spin at just 7,200rpm. USB 2.0 and Serial ATA support will be native to the motherboard, along with LAN support and legacy modem support. With CD-RW drives already at 10x speeds, Zip and Jaz drives will likely be 86ed by 2001.

We've previously made predictions about the floppy's demise, and have had to eat our words, so we predict that the floppy will survive another Dream Machine cycle. Hell, we're willing to state your PC will have a floppy *five* years from now. Hey, we have to hedge at least one bet...

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Dang. Forgot the racing stripes.

But that's about it, in terms of souped-up, sports-car qualities. Introducing TurboRing,™ the world's first trackball with patented Scroll Ring™ technology and three programmable buttons. Now, you can blast through long documents. And whiz through Web pages. All in sheer, ergonomic bliss. The idea of comfort and handling at high speeds is coming to a whole new Autobahn. Your desktop. For more information, visit www.turboring.com. And please, buckle up.

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HANDS

THE 25 BEST PALM APPS

PHOTOGRAPHY BY AARON LAUER

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DOWN...

YOU'VE NEVER HEARD OF.

Your Palm will help you keep track of Mom's birthday, Cousin Delilah's e-mail address, and how much you owe the dentist, but for just a little dough—and sometimes for free—you can grab a slab of rad apps and peripherals that'll make your Palm look less like a datebook and more like a notebook. Read with it, type with it, shop with it, surf with it, and even over-clock it. On the following pages, we'll show you the hardware and software that'll make your Palm da bomb (along with a few bombs you should actually steer clear of).

By Matthew Jolley

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UNITCONV

How do I convert pints to cups? Add 3.5, carry the 6...ah, screw it!

The world is full of competing systems of measurement, so you'll probably be forced to convert between them at some point. Don't fret—just pull out your Palm, call up this capable shareware program, select the appropriate category (Weight, Length, Temperature, Volume, Energy, Pressure, or Area), and you're on your way to conversion bliss. Over 40 units of measure are represented, making this scant 17K program a must-have for anyone who has trouble doing division without a pen and paper. (By the way, 1 pint is equal to 4.26 cups.) **www.palmadd.com; Shareware, $7**

ARRANGER

The Palm's built-in memo pad is fine for jotting down a few notes, but when it comes to heavy-duty organizing, you need something more substantial. Enter *Arranger*, an application designed solely to create easy-to-follow lists. *Arranger's* ingenious use of collapsible menus means that a long shopping list or meeting plan can be collapsed into four or five main topics, then expanded out to display details. Entries can even be linked to items in an address book, expense application, datebook, or to-do list. We found *Arranger* especially useful during closed-door meetings regarding Reviews Editor Josh Norem's disturbing dance habits. **www.olivebr.com/index.htm; Shareware, $19**

BIGCLOCK

If, like us, you spend most of your time in the same place, you're probably not interested in scrolling through a list of 6 zillion cities and time zones in order to set the correct date and time on your Palm. Blissfully simple to use and read, *BigClock* displays the current date and time—that's it, that's all it does. Rather Zen, isn't it? You can also set *BigClock* to display the current week, day, and hour, or choose a *BigClock* version that includes four alarms, two timers, and the ability to display the time in four different time zones. **www.gacel.de; Free!**

CRUISECONTROL

Sure, you've overclocked your computer, pushed your automatic pencil sharpener up three bins, and increased the multiplier on your three-way light bulb—but have you overclocked your Palm? The Palm's Dragonball processor is surprisingly overclockable, sometimes yielding up to a 66 percent increase in program speed. *CruiseControl* is as straightforward as it gets: A screen displays two buttons, one labeled "fast" and one labeled "slow." Get past the Alice in Wonderland-ness of it, and tap "fast" to instantly overclock. When you tire of life in the fast lane, tapping "slow" will revert your Palm to its normal state. Do, however, remain aware of the risks: Not only does overclocking eat your batteries, but there's also a slight chance it could eat your processor. You've been warned. **www.backupbuddy.com; Free!**

CSPOTRUN

Take advantage of the Palm's ability to display full-length books or documents with *CSpotRun*. A small toolbar at the bottom of *CSpotRun's* screen lets you change a document's

Palm Portable Keyboard

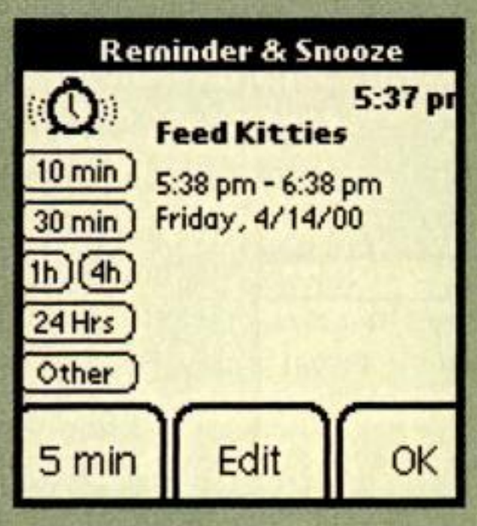
Yeah, we showed off this little number in the February issue, but it's so cool, we had to highlight it again. Mount your Palm on the Palm Portable Keyboard's (www.palmorder.modusmedia.com) brackets, slide the key plates together, and voilà—your Palm is equipped with a very usably sized 69-key keyboard that includes the Palm's four main hot keys (Date, Phone, To Do, and Memo). Hit the Function key, and those four hot keys function as the Palm's sub-menu buttons (the Apps, Menu, Calculator, and Find buttons on your Palm's screen). The Portable Keyboard folds up into something roughly the size of a cigarette case, and the tough outer shell can survive some pretty hard knocks. You can't use it to watch DVD movies on an airplane, but a Palm equipped with this keyboard will surely make you think twice about lugging a notebook on your next trip.

$100; Palm
Buy www.SeeMeBuyMe.com
877.751.7467
ID#0923

formatting and text style, while additional menu settings let you jump to different parts of the document, search for words, and autoscroll. Best of all, *CSpotRun*'s tiny footprint actually leaves enough room on your Palm to carry around a few short stories, classic novels, or, if you're News Editor Gordon Mah Ung, copies of memos that we suspect were stolen from the Warren Commission.

www.pobox.com/~wtc/ palmos/ cspotrun; Free!

DATEBK4



Behold, the Palm datebook on steroids. Upon launch, *Datebk4* looks just like your standard-issue Palm datebook, with a few new buttons at the bottom. But those buttons allow you to open daily, weekly, weekly with details, monthly, and even yearly views of your schedule. *Datebk4* also completely changes your Palm's alarm screen: Each time an alarm goes off, you're greeted with a large, easy-to-tap "OK" button; a "Wait 5 min" button; and an "Edit the alarm" button. *Datebk4's* options don't add up to a drastic departure from the standard Palm datebook, but they do provide access to several functions that seemed to be missing from the original—and they do it without major bloat.

www.pimlicosoftware.com; 45 Day Trial, $20

DIDDLEBUG

Sometimes, you just want to scribble yourself a quick note—"Remember hostages in basement" or "Tell landlord about gas leak"—but don't feel

like firing up your Palm's datebook, picking an exact time, and setting up an alarm. *Diddlebug* acts as a digital sticky-note pad: Just scribble down a note, set a timer, and go on with your life. One note to the designers, though: Any chance you can come up with a less silly name than *Diddlebug*?

http://blevins.simplenet.com/ diddlebug; Free!

PORTAMONKEY

PortaMonkey would probably eat a Tamagotchi for lunch—after trying to hump its leg. *PortaMonkey* is a real bastard of a virtual pet. He's a heckuva lush, too. Basically, keeping your monkey clean, happy, and strong means plenty of beer drinking, ball playing, and drug use. If your *PortaMonkey* misbehaves by refusing his beer or throwing feces at the screen, you can give him an electric shock—but watch out, because he'll jump around and possibly flip you the bird. You can kill *PortaMonkey* if he gets too out of control, but if you can tolerate a monkey that chases after a hapless bunny in hopes of getting' a little bunny lovin', you'll keep *PortaMonkey* around for a while.

www.minordemons.com; 2-Day Trial, $8

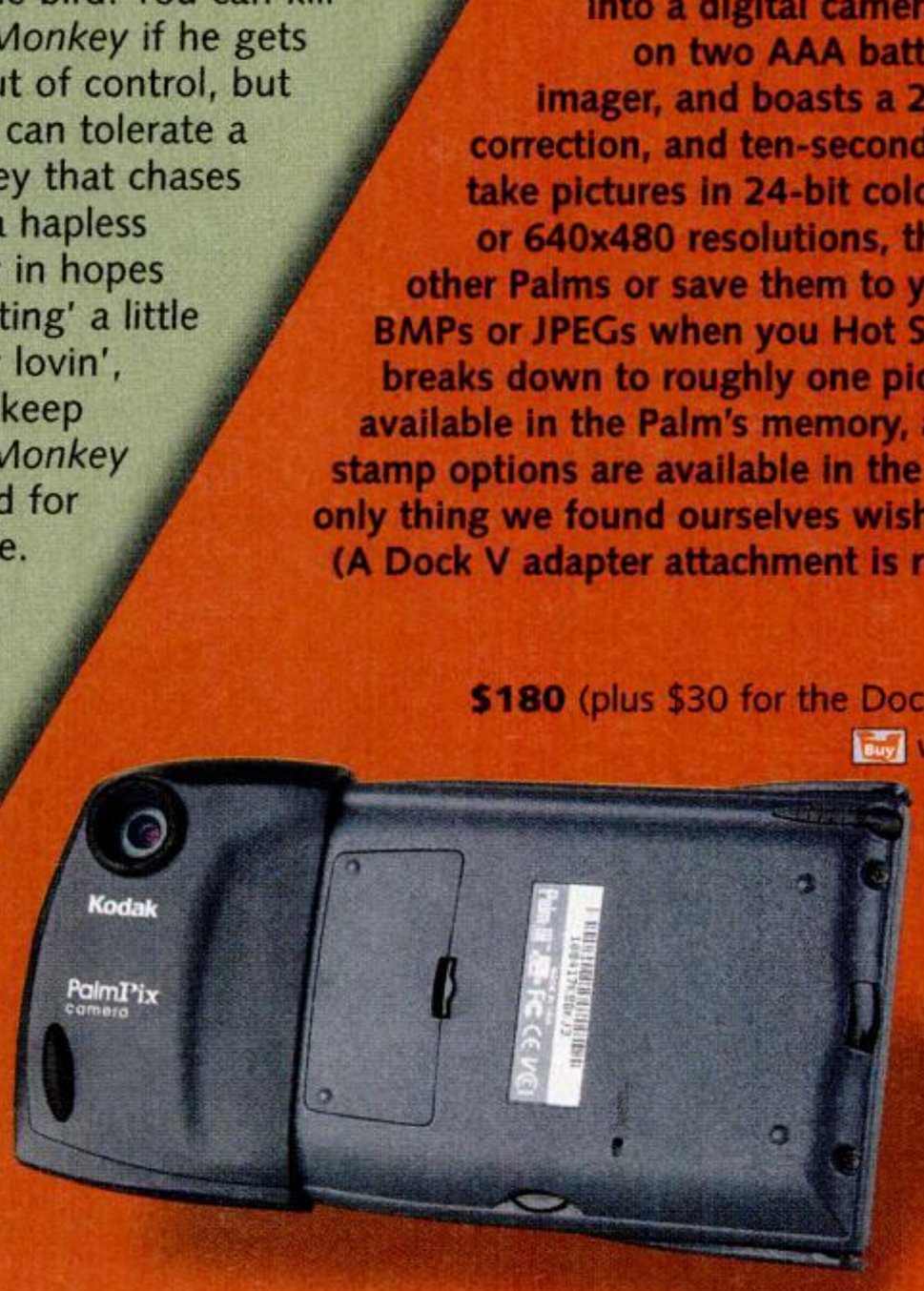
MOON PHASE

Set *Moon Phase* to any date in the Palm's range (01/01/1904 to 12/31/2031) and you'll get a textual and graphical representation of the moon phase on that date. *Moon Phase* also displays the dates of upcoming half, new, and full moons. *Moon Phase* might not have a lot of practical application, but it's

Kodak PalmPix Camera

Clip the Kodak PalmPix (www.kodak.com) to the bottom of your Palm, and you've turned your PDA into a digital camera. The PalmPix runs on two AAA batteries, uses a CMOS imager, and boasts a 2x zoom, auto-white correction, and ten-second self-timer. You can take pictures in 24-bit color at either 320x240 or 640x480 resolutions, then beam images to other Palms or save them to your PC's desktop as BMPs or JPEGs when you Hot Sync. Picture storage breaks down to roughly one picture for every 100K available in the Palm's memory, and time/date/label stamp options are available in the PalmPix menu. The only thing we found ourselves wishing for was a flash. (A Dock V adapter attachment is required for Palm Vs and Vxs).

$180 (plus $30 for the Dock V adapter); **Kodak**
Buy www.SeeMeBuyMe.com
877.751.7467
ID#0924



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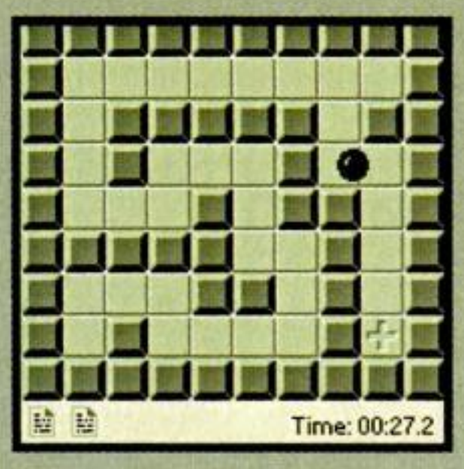
interesting to know that on January 9, 1985, the moon was in day 17 of its cycle and was a waning gibbous. Also good for scheduling virgin sacrifices...not that we're into that sort of thing. **/home.att. net/~sckienle/palm/home.html; Free!**

MULG

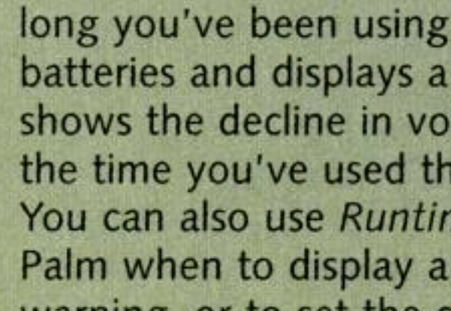
Remember those little puzzles you used to get with McDonald's kids' meals? The ones where the object was to roll the little ball through the plastic maze without letting it fall into the holes? Remember how you'd eventually just get frustrated with the puzzles and run them over with your bike? Or was that just us? In any case, the game is now available for the Palm, and it's as frustrating as



ever! Use your stylus to roll the ball through several mazes, or use an add-on tilt sensor—you can buy one or get the instructions to build and attach your own—to actually tilt your Palm and play the game just like you did all those years ago. (You might want to skip the part where you run it over with your bike.) **www.ibr.cs .tubs.de/~harbaum/pilot/mulg.html; Free!**

POCKETROGUE

Back in the day, "gaming" meant breaking out the Coleco ADAM and *Tunnels of Doom*, or any one of about a dozen other games that involved wandering through a series of rooms, collecting gold, tools, and magical elements, and killing some bad guys. Now you can kick it old skool on your Palm with *PocketRogue*. The game is *very* primitive-looking—levels and entities are formed out of ASCII characters—but *PocketRogue's* hokiness is what will compel you to play. Before you know it, people on the bus are giving you dirty looks because you're cursing out loud when you're slain by a goblin. If you want a break from all the *Tetris* clones and card games that seem to populate the Palm gaming world, here's your chance. **ue.nl/games/roguelike/rogue/index.html; Free!**



RUNTIME

Ni-Cad? Alkaline? Rechargeable alkaline? *Runtime* takes the guesswork out of choosing batteries for your Palm. It lets you monitor how long you've been using a set of batteries and displays a graph that shows the decline in voltage over the time you've used the batteries. You can also use *Runtime* to tell your Palm when to display a low-battery warning, or to set the critical voltage levels at which your Palm automatically powers off. Oh, and just so you know—alkaline batteries kick ass over the others. **http://home.germany.net/101-216666/englisch.html; Free!**

SHOPLIST

You've spent a lifetime abusing your mind, and in retaliation it keeps you from remembering things such as where you put your keys, or what you meant to buy at the store. Fight back against brain fade with *Shoplist*. Its categories help you sort lists of things to buy according to just about any category you

OmniSky Minstrel V Wireless Modem

Stop saving your pennies for a Palm VII—OmniSky's Minstrel V wireless modem (www.omnisky.com) offers speeds of up to 19.2kbps over a CDPD (cellular digital packet data) network. The Minstrel V snaps to the back of the Palm V, and offers full TCP/IP Internet access and e-mail setup for your existing POP3 accounts. An OmniSky directory on your Palm displays listings for Shopping, Travel, and Local sites, much like a search engine home page, but you can enter any URL and visit just about any page on the web. Your request is fielded through OmniSky's server, which stores the PQAs to tons of URLs, so you don't need to install them. In some cases, OmniSky uses a proprietary technology to transcode a URL's content into something your Palm can read. But all you need to do is install the OmniSky software—your account is activated before they even send your modem.

$300, plus $40 a month for service; **OmniSky**
www.SeeMeBuyMe.com
877.751.7467
ID#0925

For definitions of Terminator words, check out the Terminator online at www.maximumpc.com.

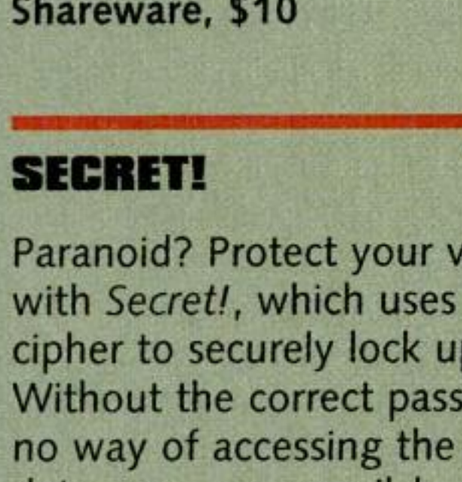
can come up with, so you can list your intended purchases by Store or by Sodium Content, for example. When you've purchased a product, just check it off. Lists can also be sorted according to items you've already purchased, or those you still need. **www.geocities.com/SiliconValley/Haven/1559; Free!**

XWORD

Incredibly popular among the brainiac set, *XWord* delivers dozens of crossword puzzles to your Palm, or hooks you up with freshly downloaded puzzles from such heavy hitters as *The New York Times*. *XWord* is a full-featured program with an easy-to-use interface and options that include getting hints on harder questions. If you're really stuck, *XWord* can even solve a question for you. One of the best time passers since *PortaMonkey*. **www.roadkill.com/penguin; Shareware, $10**

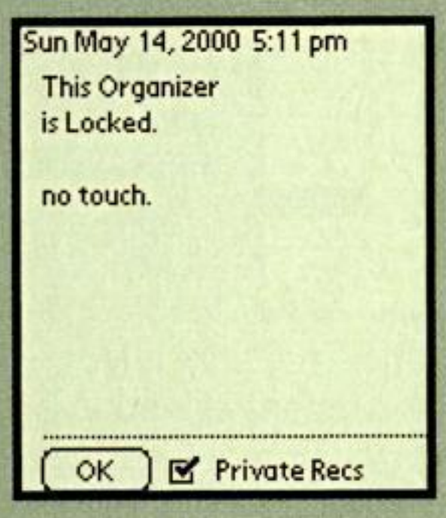
SECRET!

Paranoid? Protect your valuable data with *Secret!*, which uses a 128-bit cipher to securely lock up your data. Without the correct password, there's no way of accessing the protected data—none, zero, zilch. In fact, the only option is to delete *Secret!*, and thus delete the data that it's protecting. Think of it as a really secure version of the Palm's memo pad—you can store things like credit card numbers, the phone numbers of "special" friends, and where you hid the bodies. No one but you will ever know. **www.linkesoft.com; Shareware, $19**



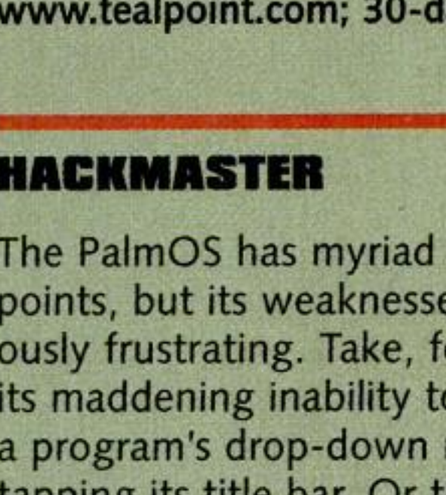
TEALLOCK

Your Palm is probably storing such vital information as family addresses, non-disclosure agreements, recipes for your Aunt Ethel's award-winning banana nut bread—things that musn't fall into the wrong hands. If *Secret!* doesn't float your boat, check out TealPoint Software's nifty tool, *TealLock*, which assigns you a pen stroke that automatically powers off and locks your device. The program will also automatically hide your private documents at power off, so even if you forget to lock the device, snoopers won't be privy to the fan letter you're planning to send to the Backstreet Boys. If the sneaky Pete does a hard reset, he's greeted with the built-in Palm password screen. **www.tealpoint.com; 30-day Trial, $12**



HACKMASTER

The PalmOS has myriad strong points, but its weaknesses are seriously frustrating. Take, for example, its maddening inability to call up a program's drop-down menu by tapping its title bar. Or the fact that the memo pad's dotted lines sometimes obscure the bottoms of letters, making it almost impossible to distinguish between the letters I and J. The Palm people seem content to sit and whistle while you agonize over this, but *HackMaster* comes to the rescue with dozens of patches designed to tweak and improve upon Palm's work. In fact, several of the programs here require *HackMaster* to work properly. **www.daggerware.com; Free!**



TEALECHO

Why the hell does Palm display an O when you graffiti in a Q?! Graffiti is easy enough to learn and use, but some characters are infuriating to enter. TealPoint's *TealEcho* offers some solace. When you begin drawing in the graffiti writing area, *TealEcho* pops up a box that shows an outline of the writing area and an echo of what you're entering. That way, you can see what your Palm is registering when you write—and note that when entering a Q, it helps to accentuate the tail. **www.tealpoint.com; 30-day Trial, $12**

Memo 2 of 2
Unfile
apping them.
Tap the pick list in the top right
corner to display or create up to 15
categories in the Address Book, To
Do List, Memo Pad, and Expense.
Done
Details

SILENCE

You just couldn't leave it at home, could you? You took your Palm to the funeral, and forgot to turn off the alarms. Throughout the eulogy, alarms pierced the heavy air of mourning with light, cheerful tones. Were you really that shocked when a rather portly man took the Palm from your hand and silenced it with the heel of his shoe? All of this could have been prevented with *Silence*, a fairly simple application that can be used to schedule silence from your Palm during certain hours, or to instantly shut the little bugger up with one configurable pen-stroke. Download it now and avoid embarrassment later. **http://home.att .net/~foursquaredev/; Shareware, $5**

LIGHTHACK

If you look back over the various Palm hardware reviews that have appeared in *Maximum PC*, you'll notice that we don't care much for the fancy-schmancy inverted backlights on the newer units. Palm could have given us a choice of backlighting schemes, but they didn't, and we've been sore about it ever since. *LightHack* can be used on your newer-model Palm to bring back the normal backlit days of yore. **www.quartus.net; Shareware, $5**

SYNCALC

The standard Palm calculator is great for basic math, but if you ever need to do serious number crunching, you're better off with *SynCalc*. Albeit a tad crammed with buttons and functions, *SynCalc* can nonetheless handle all your mathematical needs with its wide assortment of options, ranging from factorials to tangents. If hardcore math really gets you going, *SynCalc* will send you over the edge. **www.synsolutions.com; Demo, $18**

UNDOCUMENTED PALM SECRETS

Granted, this isn't really an application, but it could be the best document on your Palm. This portly file contains just about anything you'd need or want to know about your Palm, from physical dimensions to power consumption. We're particularly fond of the hidden shortcut commands that allow you access to such tricks as instantly turning on or off beam transfers—or erasing your RAM, if you're not careful. No Palm should be without

VERY BAD APPLICATIONS

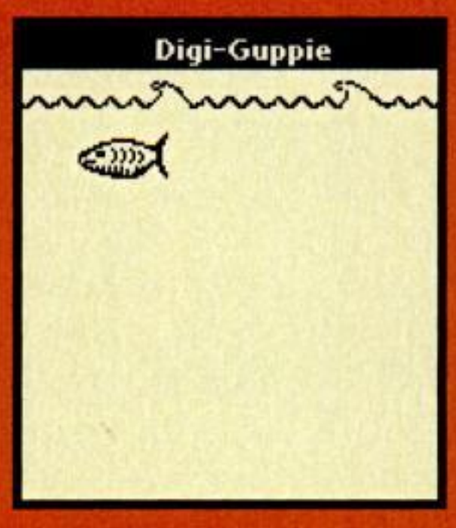
Welcome to the world of independent software development. Perhaps the following apps were designed as part of some ill-conceived college programming project, or perhaps they're just programming mutants that never found their way into the circular file. Either way... hoo-wee, these babies are bad as bad can be! At least releasing crappy Palm apps upon the world is less antisocial than releasing a virus.

CITYZEN

"When Good Applications Go Bad." Tonight on FOX. *CityZen* seemed to have lots going for it: an atlas-like representation of major cities and bodies of water, a distance calculator, and a quiz feature. But things went downhill as soon as we gazed upon the opening screen s-l-o-w-l-y being drawn before our eyes. As in, "Windows Beta to Release Time" slow. Plus, the continents were horribly distorted in order to fit onto the Palm's screen. Turn on city names or try to zoom in and you get an awful mess like the one pictured here. Avoid this bomb at all costs. www.cs.man.ac.uk/~hancocked/CityZen/index.html; Free.

DIGI-GUPPIE

The description read, "Forget Furby." Surely, any program urging us to abandon Tiger's talking mechanical gizmo would be worth downloading, right? Wrong. So, so wrong. Though it took perhaps half a second to download *Digi-Guppie*, we still feel we're owed a refund for our wasted time. All our *Digi-Guppie* did was plop a fish on the screen. You can't feed it, you can't teach it tricks, you can't even kill it! What good is a virtual pet if you can't torture it? See the *PortaMonkey* review above for an example of a worthwhile virtual pet. www.csam.montclair.edu/~hinck/guppie; Free.



MIKE THE HEADLESS eCHICKEN

The title of this program seemed so promising...but the bomb begins with an exceedingly long introduction detailing just how Mike the Headless Chicken came to be. It seems the programmer confused us with people who give a hoot. After the intro, if you

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this essential, though sometimes hard-to-read, document. **http://homepage.eircom. net/~seadancer/ index.html; Free!**

DREADLING

There's every reason in the world to believe that FPS gaming on the Palm absolutely sucks—or so we thought, until *Dreadling* busted into our world and gave us a firm smack on the buttocks. As the only FPS available for the Palm, *Dreadling* literally redefines the genre with its glorious, four-shade grayscale rendering and smooth FPS rates. Granted, the graphics are on the chunky side, and the odd shooting method takes some getting used to, but we can overlook these flaws because this is the best Palm game we've played, hands down.

www.dreadling.com; Shareware, $20

SILVERSCREEN

Palm's simple, icon-driven GUI is easy to use, but it's a little short on sex appeal. *SilverScreen* places GUI masks over the default Palm interface, and kicks it up a notch. The interfaces range from elegant to fun, and allow such enhancements as the ability to drag and drop programs into the trash. Our only beef is that to see all of *SilverScreen's* niceties, you must turn up the contrast on your PIM, often leaving the screen too dark for many other applications.

www.pocketsensei.com; Trial, $13

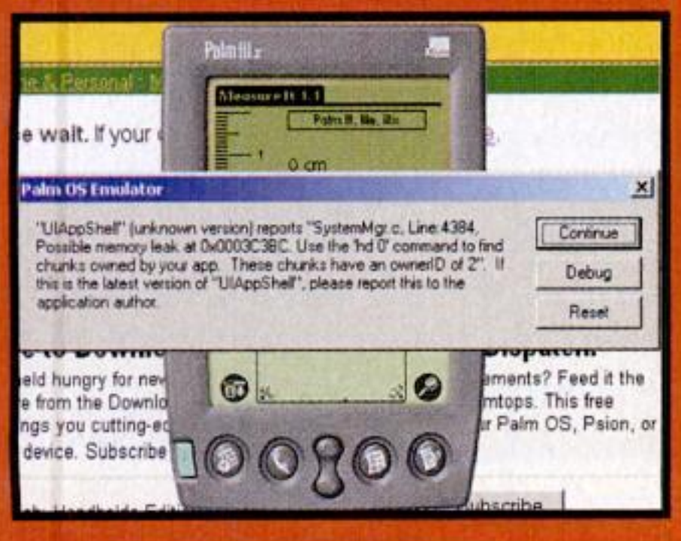
I CHING PLANNER

Who needs a guru? Get your Yin and Yang into total harmony, and learn to ride the ups and downs of your 384-hour chi cycle every time you check your datebook. *I Ching Planner* is also a personal decision assistant that will help you find the optimum time to contemplate and make important decisions. Operating it is as simple as dropping the stylus onto the casting circle displayed on the Palm's screen... but making it work means completely trusting in "the way."

www.cloudragon.com; $17

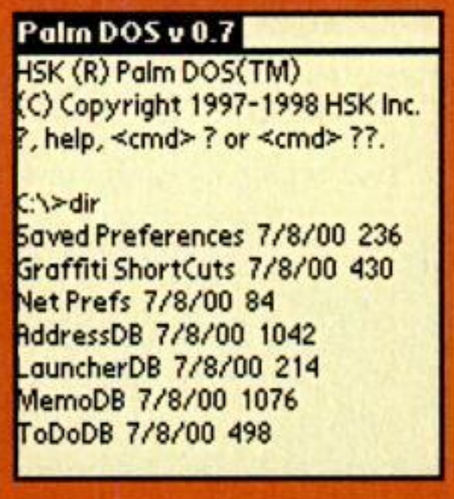
haven't already hung yourself by your HotSync Cradle's cord, comes the "fun" part: a static picture of a headless chicken, and four icons. Click an icon and it slowly moves across the static picture of the chicken. Fun for the whole family, right? *We* were longing to be headless while suffering through this abomination.
www.miketheheadlesschicken.org; Free.

THE PALMOS EMULATOR (POSE)


Palm OS Emulator
"UIAppShell" (unknown version) reports "SystemMgr.c, Line:4384, Possible memory leak at 0x0003C3BC. Use the 'hd 0' command to find chunks owned by your app. These chunks have an ownerID of 2". If this is the latest version of "UIAppShell", please report this to the application author.
Continue
Debug
Reset

Our thesaurus did not offer enough words under "bad," "evil," or "suck" for us to adequately describe this program. Upon launch, *POSE* gnaws through nearly 20MB of RAM, promptly bogging down your entire system. You'd think that 20MB of RAM would actually allow *POSE* to emulate the Palm, but more than half of the programs we ran bombed in the emulator! We tried loading different ROMs from different versions of the Palm OS, but even then, *POSE* didn't always work. This is one of the most exasperating programs we've ever used.
www.palm.com/devzone/; Free (to access ROMs, you must sign a NDA)

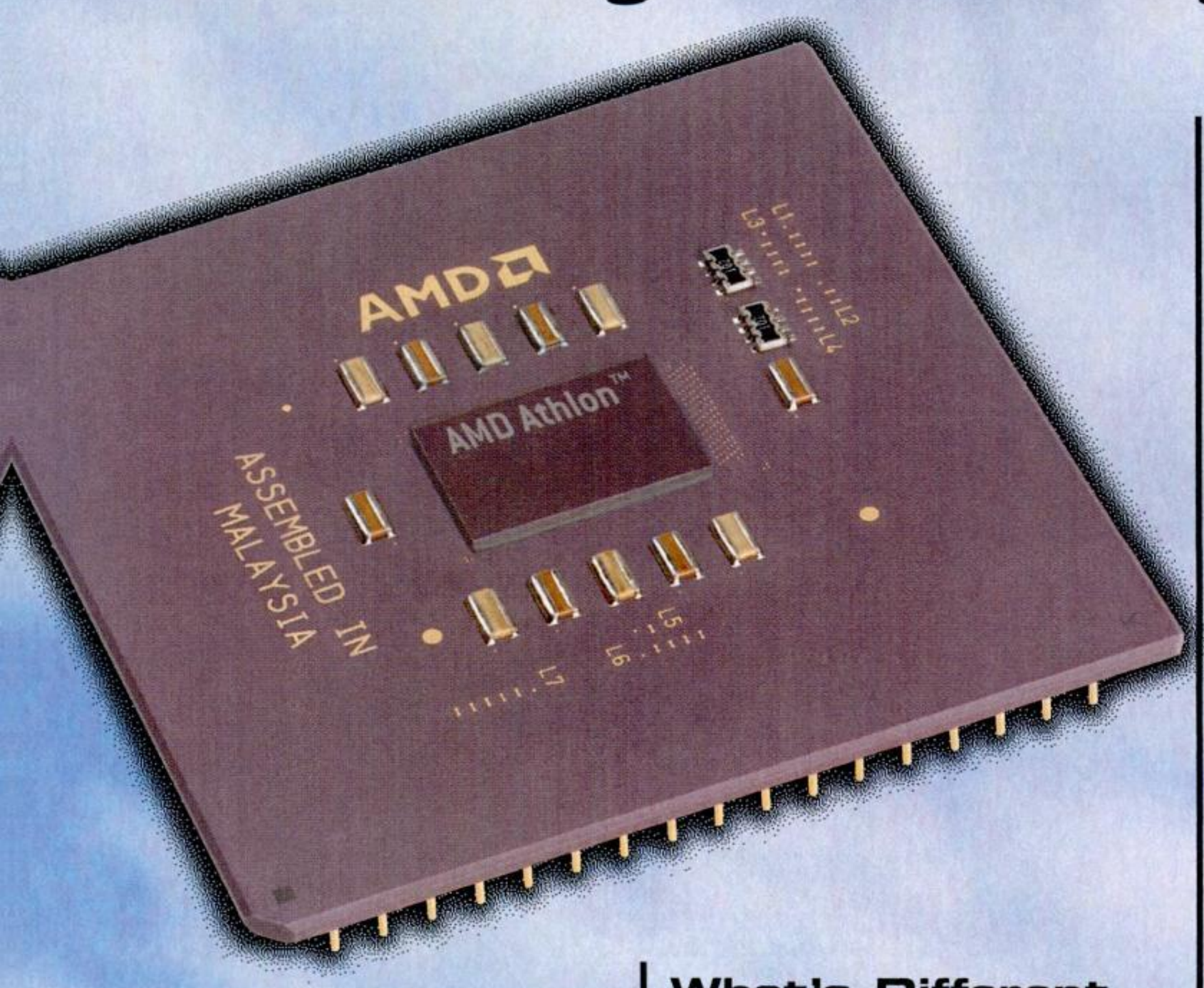
PALM DOS



From the "Why in God's name would you do this?" file comes *Palm DOS*, which provides a sort of über-DOS shell for your Palm. Go ahead, enter commands such as "dir" and get a huge list of every program on your unit! Go nuts and disable the auto-off feature! *Palm DOS* is the perfect gift for your favorite masochist, because you'd have to enjoy pain to prefer writing out commands when two taps of your stylus gives you a display that's much easier to read. http://break.org/gisle/PalmOS/; Free.

THUNDERBIR

AMD's 'Enhanced' Athlon Soars to Ever-Higher Cruising Altitudes



When AMD initially confronted Intel at the 1GHz mark, the first iteration of the Athlon was embarrassed by the Coppermine Pentium III.

Now, just four months later, AMD is back and aching for payback. This time, AMD engineers have completely revamped the "classic" Athlon with "performance enhancing" cache. The burning question: Is an enhanced Athlon faster than a P-III Coppermine? The answer is yes and no. AMD's enhanced Athlon clocked barrier-breaking performance in our application benchmarks, but, oddly, took second place in some of our gaming benchmarks.

What's Different

Previously codenamed Thunderbird, the enhanced Athlon is markedly different from the classic Athlon in its cache configuration. Previous generations of both the Athlon and the P-III used external L2 cache chips operating at one-half the speed of the CPU (and at an even slower clip in the case of Athlons running in excess of 700MHz).

Since L2 cache is the second place that a CPU looks for information to crunch, cache size and speed directly impact the overall performance of a processor. With the Coppermine P-III, Intel moved its L2 cache directly into the CPU core, giving Intel the ability to crank this cache to full speed. At core speeds of 900MHz and faster, the P-III Coppermines have dominated the air lanes.

But that's no longer the case. AMD's new Thunderbird core moves from 512K of half-speed (and sometimes slower) external L2 cache to 256K of full-speed, on-die L2 cache. The P-III Coppermine also features 256K of on-die L2 cache, but AMD says its own L2 cache is "mutually exclusive." This means that in the new, enhanced Athlon, data in the 128K of super-fast L1 cache is not repeated in the L2 cache. This gives the new Athlon a total cache allotment of 384K. The P-III Coppermine doesn't follow this particular cache scheme. Rather, it features just 32K of L1 cache, and the data in this cache can be repeated in L2.

AMD also tweaked the Thunderbird core to upgrade from a two-way set associative cache to a 16-way set associative cache. The Pentium III Coppermine features an 8-way set associative cache. The increased sets should contribute to a more efficient cache—and fewer cache misses mean faster performance.

Though it boasts a smaller L1 allotment that's mirrored in L2, Intel says the Coppermine P-III realizes its own special speed benefits care of its Advanced Transfer Cache scheme—an extra-wide 256-bit pathway between the cache and CPU that helps offset cache size differences. Both the original Athlon and the enhanced Athlon feature a narrower, 64-bit pathway.

Enhanced Athlons are produced at both AMD's Austin plant (Fab 25) and its new Dresden, Germany mega-plant (Fab 30). The U.S.-made Athlons feature older aluminum interconnects, while German Athlons feature copper interconnects. AMD says

For definitions of Terminator words, check out the Terminator online at www.maximumpc.com.

D'S A GO-GO!

by Gordon Mah Ung

performance differences between the two process technologies are nil at current clock speeds. Copper will make a difference in six months, when speeds exceed 1GHz, but for now, AMD says people shouldn't worry if their Athlon is aluminum-based.

AMD has packaged the enhanced Athlon to fit into its new Socket A interface. While AMD will make some enhanced Athlons to fit into the old Slot A design, the availability of Slot A procs will be limited. Our message to you? Stay away from Slot A! The future of Athlon is Socket A-based.

Compatibility

The enhanced Athlon is compatible with AMD's original AMD750 chipset, as well as VIA's new KT133 chipset. Motherboards based on the doomed VIA KX133 chipset, however, will likely pose compatibility problems. Neither VIA nor AMD will actually blame each other, but both say enhanced Athlons are "not compatible" with KX133, and that it would be a better idea to buy a new KT133 motherboard. Oddly, many people who already own KX133 boards are reporting no problems with running enhanced Athlons.

Performance

We ran comparative tests on three CPUs: enhanced Athlons running at 1.1GHz and 1GHz, and a P-III running at 1GHz. In the *bootMark*—an integer-heavy test that relies heavily on cache size and speed—the enhanced Athlon absolutely shattered Lab records. The 1.1GHz enhanced Athlon turned in an incredible score of 592.3. All the 1GHz P-III could muster was 493. Even the 1GHz enhanced Athlon pulled down a shattering 538. Yikes! What happened? We believe the relatively small *bootMark* routines fit snugly into the Athlon's larger cache, giving the Athlon a triumphant assist.

The Athlons continued to spank the P-III in other muscle tests, such as our *Photoshop* script, an MP3 encoding test, and the SiSoft *Sandra Pro* benchmark. In contests between the 1.1GHz Athlon and 1GHz P-III, the Athlon ran away. Even in the clock-for-clock, 1GHz-versus-1GHz dogfight, the Athlon had the upper hand.

But surprises came in the gaming benchmarks. From *Quake III* to *Expendable* to our Direct3D test, the Athlon hit mighty Gs, but flew no faster than the P-III. Even the scary-fast 1.1GHz Athlon was beaten by the slower 1GHz P-III. How can the Athlon lay down the law in application benchmarks, but get whipped in gaming? Isn't Athlon *the* gaming CPU? Not anymore, apparently. During our latest testing, the Pentium III ruled the gaming roost, albeit by a very slim margin. What gives? Is it possible that VIA's new KT133 chipset still has teething pains? At press time, BIOS patches were being released by mobo vendors almost weekly, and our reference system from AMD was downright twitchy. (AMD officials believe our test box's motherboard may have been defective or was damaged in shipment.) If you're frightened by VIA chipset issues, it might be safer to wait for AMD's new 760 chipset, which supports the latest checklist features and SMP.

Availability

AMD seems able to turn up the horsepower at will. Though Intel is primed to introduce its own 1.13GHz P-III, a casual look through online storefronts shows that even the 1GHz P-III is still extremely scarce. AMD, on the other hand, is cranking out 1GHz CPUs like crazy, and was able to give us a 1.1GHz sample without thinking twice. As far as pricing goes, enhanced Athlons will cost no more than similarly clocked classic Athlons.

ENHANCED ATHLONS AT A GLANCE

Codename:	Thunderbird
Transistors:	37 million
Size:	About 122mm²
Core Voltage:	1.70 volts

SPEED/PRICES (IN LOTS OF 1,000)

1.1GHz:	Pricing not available
1GHz:	$990
950MHz:	$759
900MHz:	$589
850MHz:	$507
800MHz:	$359
750MHz:	$319

THE NEW, 'ENHANCED' ATHLON: DARE TO COMPARE

MANUFACTURER	AMD	AMD	INTEL
Model	Enhanced Athlon	Enhanced Athlon	Pentium III Coppermine
Speed	1.1GHz	1GHz	1GHz
bootMark	592.3	538.5	493
SYSMark2000	212	191	196
Photoshop 5.5	118 sec	125.8 sec	129.8 sec
SiSoft *Sandra Pro*	3068 MIPS	2787 MIPS	2695 MIPS
SiSoft *Sandra Pro*	1530 MFLOPS	1393 MFLOPS	1337 MFLOPS
MP3 Encoding	64 sec	65.7 sec	74.8 sec
Inspire 3D	215 sec	239 sec	207 sec
3DMark2000	62.1fps	62.6fps	70.1fps
Direct3D Test			
Quake III 1.17 Demo 1	68.1fps	71.3	74.7fps
Expendable	92.1fps	86.9fps	92.6fps

1GHz Coppermine P-III system: 256MB PC800 Kingston Direct RDRAM, Intel VC820 motherboard, 32MB GeForce GTS videocard, Maxtor 7,200rpm hard drive. **1.1GHz Enhanced Athlon system:** 256MB PC133 CAS2 SDRAM, AMD reference motherboard with KT133 chipset, 32MB GeForce GTS videocard, IBM 7,200rpm hard drive. **1GHz Enhanced Athlon system:** 256MB PC133 CAS2 SDRAM, MSI KT133 motherboard, 32MB GeForce GTS videocard, IBM 7,200rpm hard drive.

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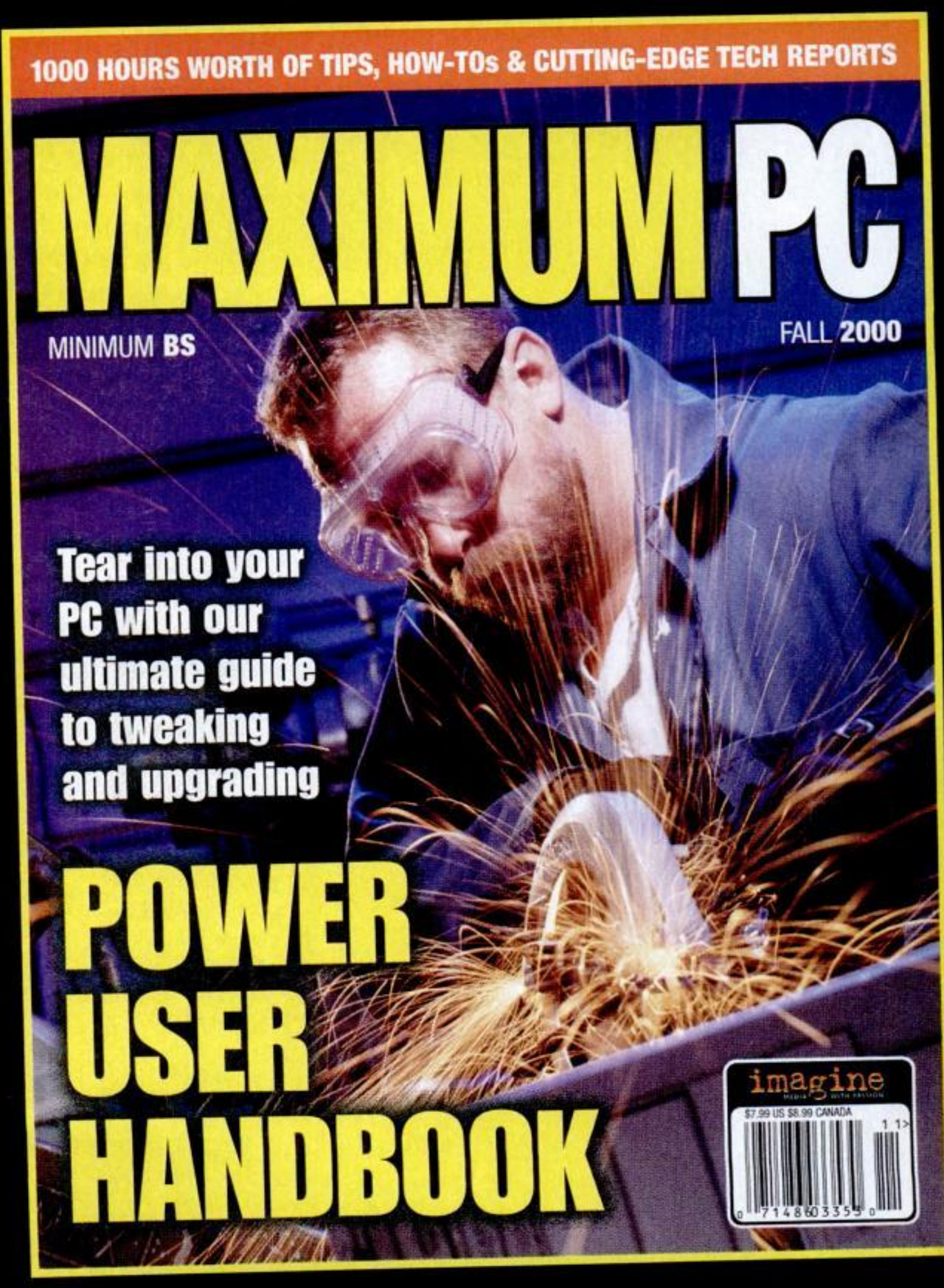
A special issue from MAXIMUM PC

POWER USER HANDBOOK

Everything you need to build, upgrade, and tweak your über system in one jam-packed issue. Don't miss the *Power User Handbook*, the ultimate PC power reference guide from the editors of *Maximum PC*.

Look for the *Maximum PC Power User Handbook* on newsstands only, October 17th through January 17th, at Barnes & Noble, B. Dalton, Borders, CompUSA, Waldenbooks and many other retailers.


1000 HOURS WORTH OF TIPS, HOW-TOs & CUTTING-EDGE TECH REPORTS
MAXIMUM PC
MINIMUM BS
FALL 2000
Tear into your PC with our ultimate guide to tweaking and upgrading
POWER USER HANDBOOK
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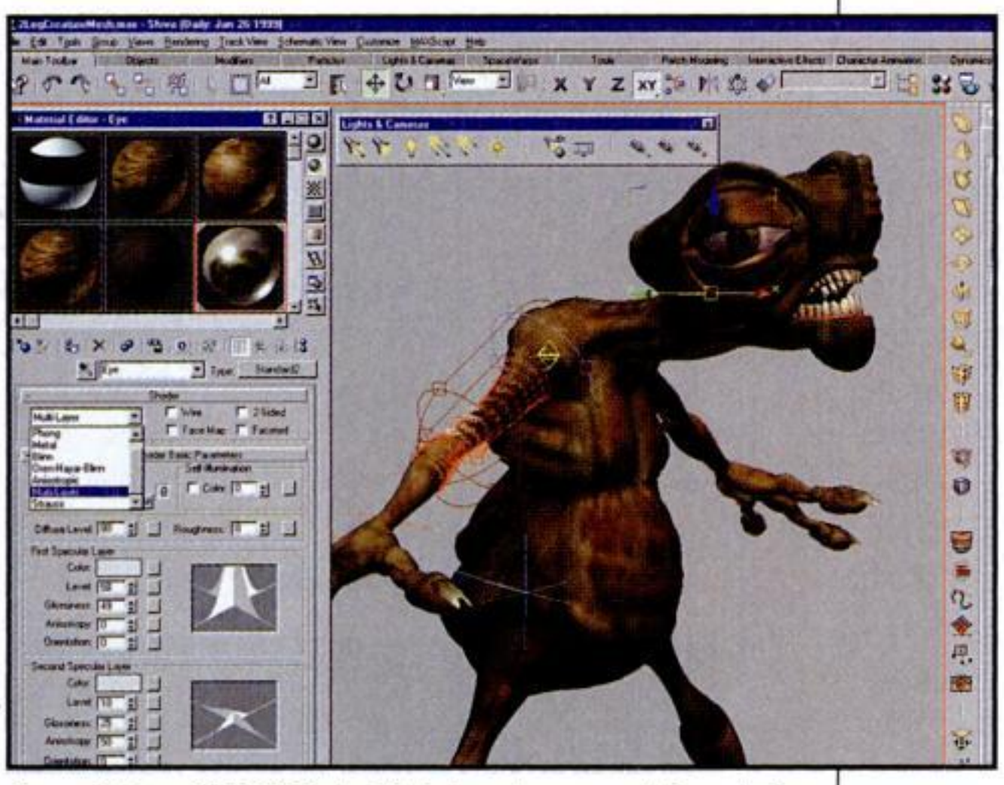
Not-so-OpenGL

MATROX DISCUSSES ITS PROBLEMATIC OPENGL DRIVER

The celebrated battle between OpenGL and Direct3D has ended in a stalemate. Neither 3D gaming API could gain a decisively dominant foothold in the game development community, so now videocard makers must write drivers for both APIs, just to keep gamers happy.

Writing clean, reliable drivers has never been an easy task for videocard vendors, and for some vendors, OpenGL drivers have been particularly wily beasts to subdue and corral. Case in point: Matrox's heartache over getting a robust OpenGL ICD up and running for its G200 and G400 graphics processors. We spoke with Alain Thiffault, Global Software Product Manager at Matrox, about what goes into writing a full OpenGL ICD.

ICD stands for Installable Client Driver. In contrast to an MCD (Mini-Client Driver), an ICD not only lets you play games written to a particular API, it also lets you develop content according to that API. If you ever intend to use your videocard for workstation chores (let alone trouble-free game playing), you'll definitely want a fully functioning ICD.



A good OpenGL ICD is built to handle powerful rendering apps such as *3D Studio Max* as well as games.

MPC: You first began developing the OpenGL ICD for the G200 in 1998, but it wasn't released until the G400 was released in 1999. What happened?
Thiffault: The initial project was started with the G200, but we were late on the release of the OpenGL driver, meaning that the product hit the market before the driver did. We continued working on it, and released a beta version several months after the launch [of the G200]. By then, the G400 was in its design phase, and because of the similarities between the two products, we began working on an OpenGL driver for the G400 as well.

It's important to understand that an OpenGL driver is the complete API in one lump of code. With a standard driver, like a 2D GDI driver, you don't have access to the internals of the driver—essentially, it's a locked black box *[a collection of code written by Microsoft and inaccessible to anyone else]*. You know the format of the data that's exiting the black box, and you're given a specification by Microsoft that details the entry points of the driver. The GDI module calls these entry points and provides the arguments needed to carry out the task. Writing a driver for a black-box API is simpler because we know our hardware—we know what registers to program.

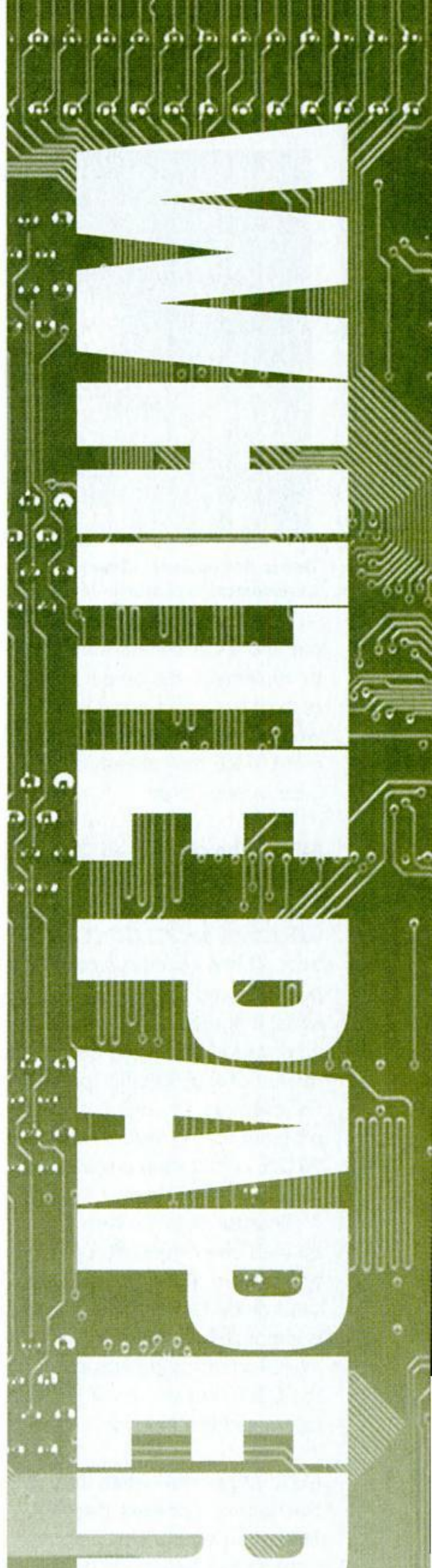
OpenGL ICDs are difficult to write. Once you sit down to do an ICD, you need to be prepared to handle the complete API in your code. An OpenGL ICD needs to take the entry points directly from the application and handle the entire pipeline. It could be a request to transform a matrix of vertices, or it could be a request to render something to screen.

MPC: What's the main difference between a Direct3D driver and an OpenGL ICD?
Thiffault: With Direct3D, all the API black boxes are supplied by the OS. With OpenGL, you need to write your own API boxes from the ground up. With OpenGL, we get a specification from the OpenGL board—the latest for OpenGL is 1.2—then we have to comply with that specification.

ICD development requires much more work, since it also involves writing the software transform and lighting. With D3D, Microsoft or the application covers T&L. Of course, with the latest versions of DirectX, developing drivers for OpenGL and Direct3D are getting to be very similar tasks.

As the API is evolving, and as hardware evolves with it, Direct3D driver development is getting more complicated. DirectX 7.0 started to expose some T&L, and DirectX 8.0 will take this support a step further. As T&L support evolves, Direct3D will become more complicated to implement.

But everyone has been working on Direct3D drivers for a number of years, so even if it gets more complicated, you always have an existing base that works, and that you can build upon. In the case of OpenGL, all the board makers had to start from zero and build an ICD that supported a specification already in place. If DirectX 8.0 comes



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Due to its popularity, *Quake III* is driving OpenGL driver development in consumer-level videocards.

out and it's as complicated as OpenGL to implement, the time it will take board makers to write a new Direct3D driver still won't be as long as the initial ICD development, since they already have a DirectX 7.0 base to work from.

MPC: Who certifies an OpenGL ICD?
Thiffault: Certification is a two-part process. Microsoft does the WHQL certification, which includes 2D GDI, D3D, and OpenGL tests. This is generally accepted for gaming purposes and for entry-level workstation tasks; if you want to go to higher-level workstation tasks, you need to go to the [maker of the] specific app you're targeting. For example, Discreet has a certification program for *3D Studio Max*, PTC has a PRO/E certification program—there are lists and lists of them.

Because OpenGL is so complex, coming up with one certification program for every type of app, from games to thirty-thousand-dollar CAD workstation applications, is impossible. For our products, we figured WHQL certification was good enough for the G200, but we're still pushing for application certifications for the G400.

MPC: In general, when does the driver development process begin?
Thiffault: Driver development can start up to two years before we begin working on a chip, or it can start four months before we get our engineering samples of the chip. OpenGL is a pretty complex beast, and the way you handle development depends on the chip. If the next graphics processor being designed is essentially identical at the register level to its predecessor, our driver needs very little modification. If a new chip comes out with new features, we have to overhaul the driver. If it's a register spec difference, it's only the bottom layer of the driver—the last process, where you take the data from the software T&L and convert it for your hardware—that needs to be changed.

Now, if your chip is designed to handle T&L, that becomes extremely complicated, and the driver development process begins as soon as we've established the specs for the upcoming product.

MPC: For your next graphics processor, which will include hardware T&L, do you need to completely reconstruct the OpenGL ICD?
Thiffault: We don't have to rebuild the ICD from the ground up, since we can base it on the G400's ICD. If you picture the ICD as a container, at the top of the container is T&L and at the bottom is your register configuration, where you need to convert the data to the chip's hardware registers. With hardware T&L support, the point at which you send data to the chip moves up closer to the application.

Ideally, if the hardware can handle all the transform and lighting functions, you can take the data straight from the app and shoot it through the hardware. Then, you have to see if your hardware supports 100 percent of the features exposed by the OpenGL specification—which is pretty hard to achieve. Most of the time, there's work that needs to be done in software before the data is sent to hardware.

MPC: So, if the hardware doesn't support a specific OpenGL function, you need to figure out how to do it in software.
Thiffault: That's the big difference between Direct3D and OpenGL. In the OpenGL ICD, you need to support 100 percent of the features, as dictated by the specification. Whether you support them in software or in hardware is your decision, but the applications have only one entry point, and that's your OpenGL ICD.

Direct3D is almost the opposite, since you only expose your hardware's capabilities to the API, and the applications can only use what you've exposed to them. A Direct3D app queries the driver to find out what the hardware's capabilities are—things such as texture types and supported filtering modes—then it determines what it wants to use. If the D3D specification calls for a rendering mode that your hardware doesn't support, your driver doesn't have to fake the capabilities—it just tells the app not to use that mode. With OpenGL, if an app wants anything, it gets it; either it handles everything in hardware, or shares the load between hardware and software.

MPC: Do you spend a lot of time tweaking the drivers for specific games, such as *Quake III*?
Thiffault: There are two types of tweaks. The most valid and straightforward tweak involves optimizing your driver for frequently called-for pipes. The goal of code optimization is to maximize the performance of the hardware by removing any bottlenecks on the host side. A good OpenGL ICD is bottlenecked only by the hardware.

Other tweaks involve rendering at a lesser quality in order to improve performance—and a lot of companies do this. You're basically dealing with an algorithm whenever you process any type of 3D, and more complex algorithms require more CPU time to process. By being less precise—using a 16-bit figure instead of a 32-bit figure, for example—you'll considerably improve the performance of processing an algorithm, but you'll lose rendering accuracy. For example, instead of being white, your scene will be just a bit gray.

Frame queuing is another trick. Frame queuing starts buffering ten, twenty, or thirty frames into AGP memory, where the driver can use the CPU to accelerate the process while waiting for the 3D hardware to finish. Frame queuing is pretty much useless in games, since it results in a lag between you hitting a button and your onscreen character's response. In games such as *Quake III*, a lag like this is annoying. In a benchmark, however, frame queuing allows the timedemo to think it's finished before every frame is displayed. The time it takes to draw the twenty or so frames you have queued is the amount of time you've shaved off your benchmark.

Games such as *MDK2* access different areas of the OpenGL ICD than those used by professional apps.

All kinds of people are doing all kinds of tricks to maximize this frame queuing stuff without the user noticing it during gameplay. But this is somewhere we will not go.

—Sean Downey

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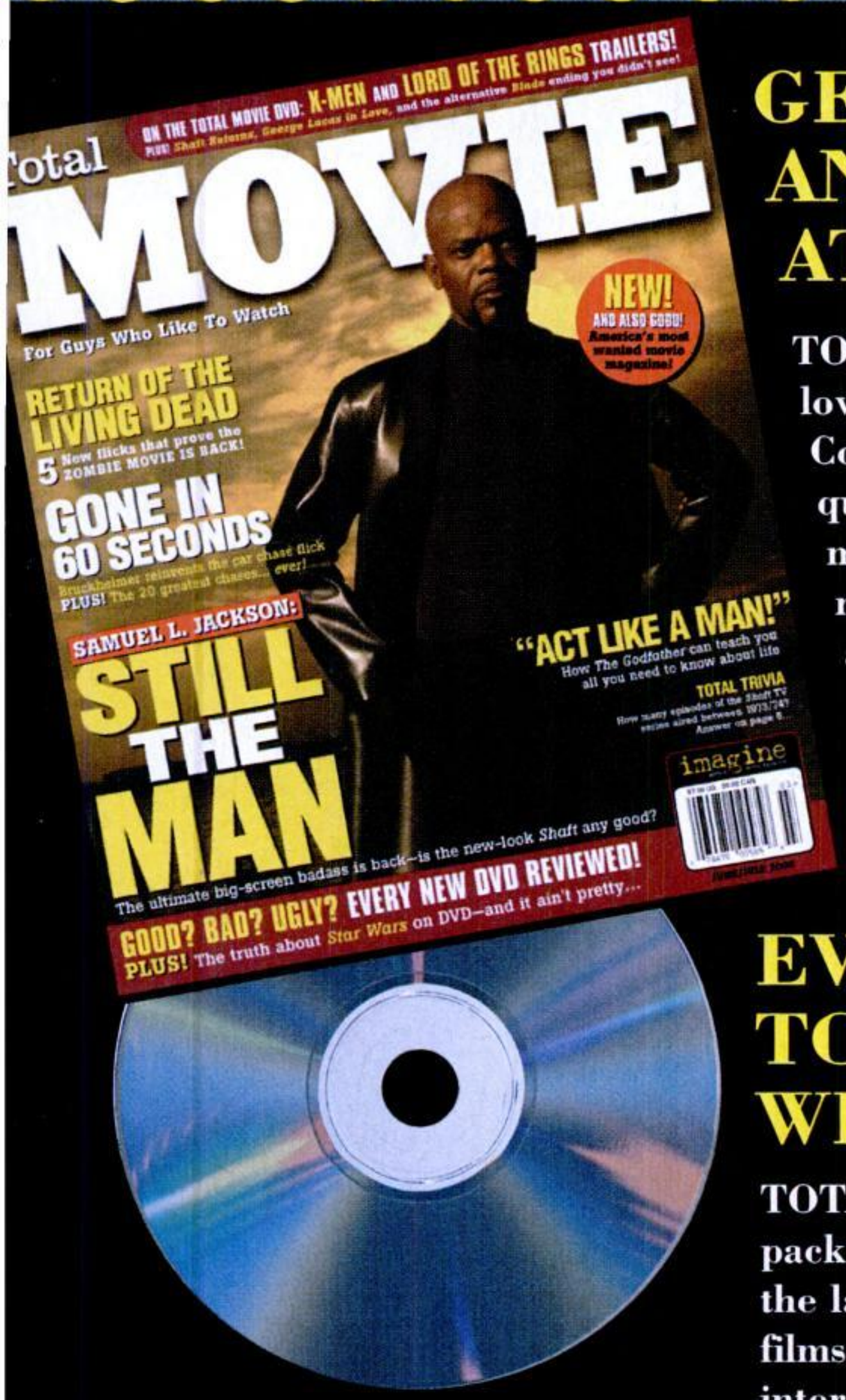
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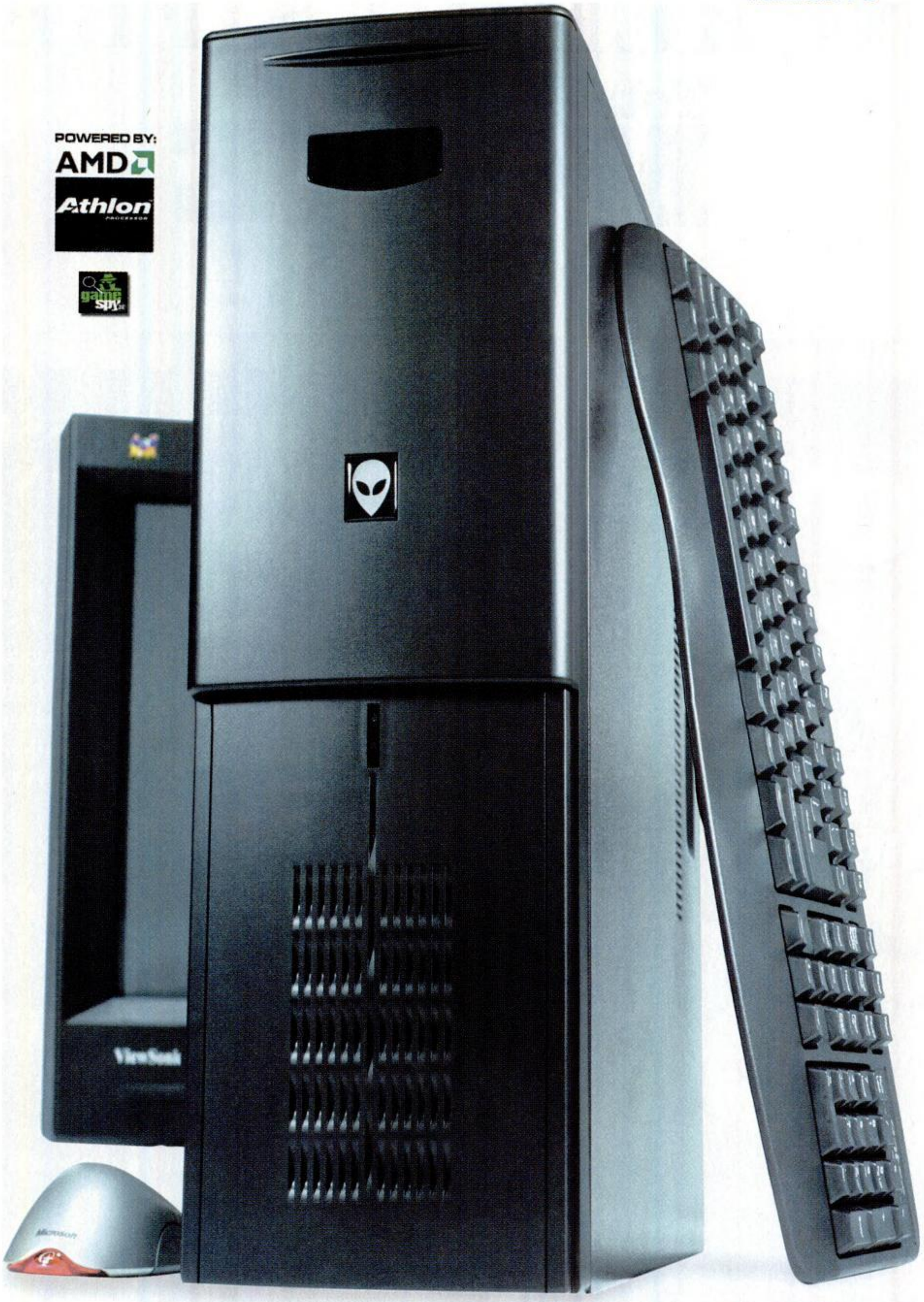

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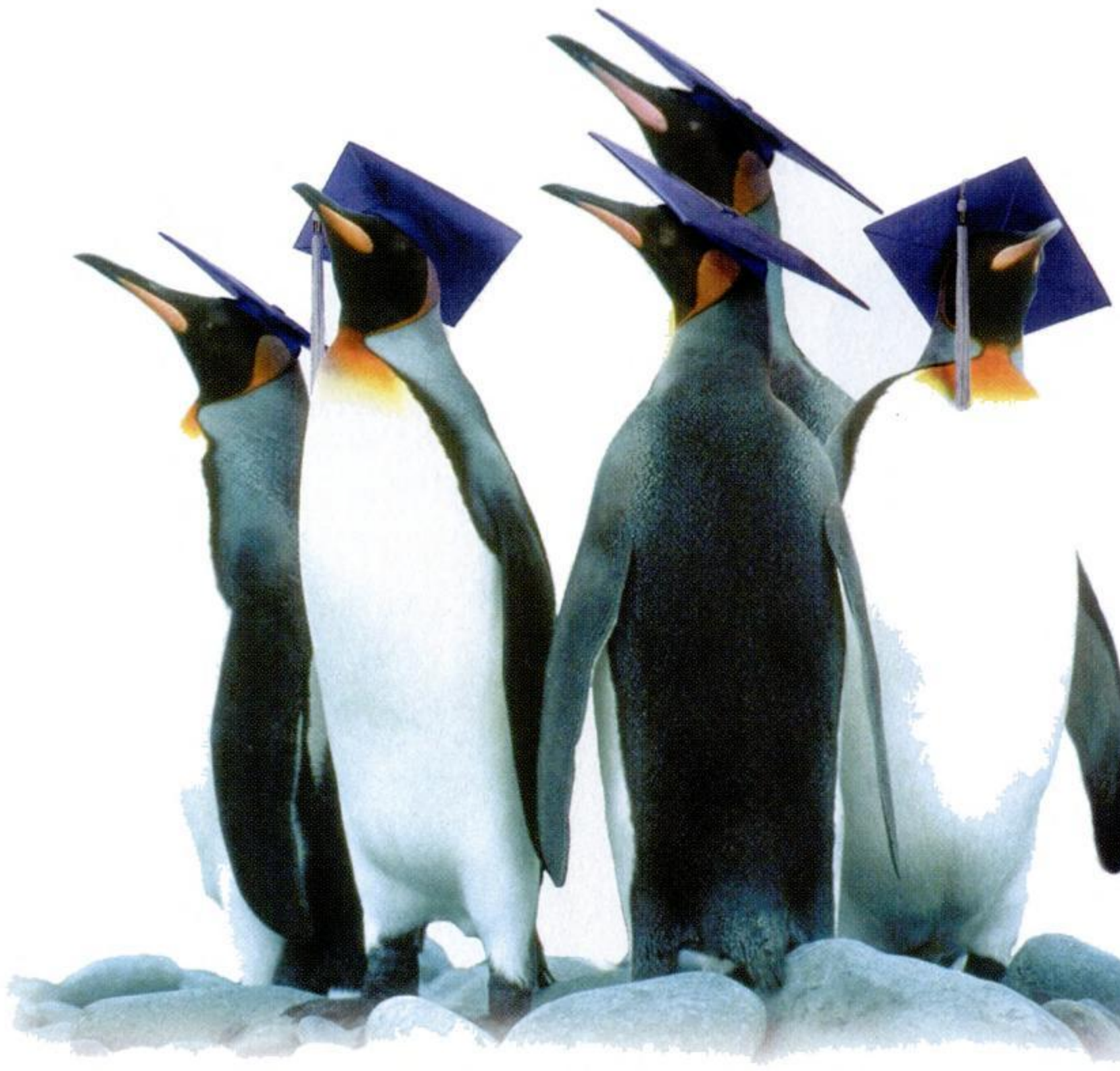

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Symptom | Diagnosis | Cure

It always starts innocently enough—you want to update your video drivers, for instance. Next thing you know, you smell smoke, your PC won't boot, and that sinking feeling overtakes your gut. Doh! Don't panic—The Doctor is here to help. If you're experiencing a PC meltdown, send a note to doctor@maximumpc.com. We can't help everyone, however. Please consult the *Maximum PC* forums or vendor tech support if you need assistance ASAP.

Premiere Problem

I have a Compaq Presario 7970 with an Athlon 700, 128MB of PC100 RAM, and built-in FireWire ports. I want to edit DV film in Adobe *Premiere* using my Sony DV Hi-8 Camcorder. However, I cannot get *Premiere* to recognize my camera for video capture. I contacted Compaq and was told to contact Adobe. Adobe said the Compaq's onboard FireWire is not a supported capture device. I have tried to find updated drivers for the FireWire card, but to no avail. A quick glance at the user support forum for *Premiere* on Adobe's web site shows that there are several other users with the same problem.

I am desperately awaiting your take on the situation, or perhaps even a workaround to get the video into *Premiere* using the capture program that came installed on this PC, which is *MGI VideoWave III*.

—Dan Maze

We've got bad news for you, Dan. Your FireWire implementation is based on a chipset that's not supported by Adobe—most likely the new TI chipset—which means you'll never be able to get video into *Premier* as easily as you could with a supported FireWire card. Luckily, Adobe has online documentation for those with unsupported video capture cards; you can find it at **www.adobe.com/support/techdocs/11a76.htm**. There are also several sites on the net, such as **www.geocities. com/bendes**, that offer detailed instructions on getting TI-based cards to work in *Premiere*.

The most common workaround is as follows: Since *VideoWave III* will export several video formats that *Premiere* can import, you can export the native compressed stream to uncompressed AVI, QuickTime, or MPG format, then import it into *Premiere* and perform your edits. Then, export it back to a format that *VideoWave* understands, and write it back out to your camcorder. Hopefully, the next version of *Premiere* will feature support for the TI-based cards, and the newer type of AVI compression they use.

> **Always check compatibility with your hardware before shelling out hard-earned money for any application.**

Microsoft Windows Update
Windows Update
Selected Software
Windows Media Player 7 Beta
Internet Explorer 5.5 and Internet Tools Beta
DEVICE DRIVERS
No updates of this type are available at this time.

We understand the temptation to play with the latest, greatest software, but beware if you install unsupported beta software, because it is just that—unsupported.

The moral of the story is, always check compatibility with your hardware before shelling out hard-earned money for any application, especially one as expensive as *Premiere*.

Beta Blues

When I'm browsing the web using *IE 5.5* and have several windows open for different web pages, I sometimes experience total lockup when I close browser windows. I've tried uninstalling *IE*, but that was nearly impossible. I've also tried using *First Aid* and McAfee *Guardian* to "catch" the shutdown, but that didn't work, either. I've downloaded all the updates from Microsoft's web page, but nothing has helped. I have to reboot quite frequently because of this problem, and it's really starting to get on my nerves!

—Jason Horn

Unfortunately, Jason, *IE 5.5* isn't an official release from Microsoft—yet. It's a beta, and when you run pre-release versions of software, you also run the risk of problems. Since uninstalling hasn't worked, the only sure fix is to reformat your hard drive, then reinstall your OS. Ouch.

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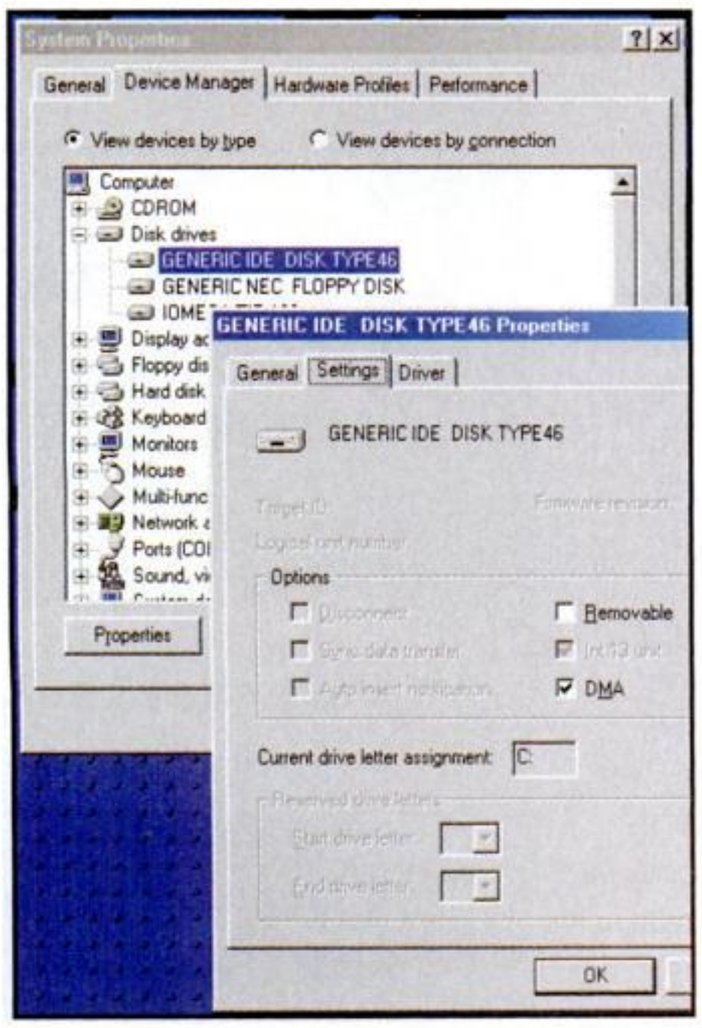
When you install beta software, such as *Internet Explorer 5.5*, keep in mind that it's not completely bug-tested and polished, and may have serious problems (unlike official Microsoft releases, which *never* have bugs, right?). With a program such as *IE* that's so tightly integrated with your OS, your problems are compounded. This may explain why you've had such a hard time uninstalling it.

If using the uninstall feature on the Windows Update site (**www.windowsupdate.com**) or using the Add/Remove Programs applet doesn't work, you're probably going to have to back up your data, then format and reinstall the OS and all of your applications. Luckily, the "Clean Start" article in our June 2000 issue (and online) contains all the information you need to do just that.

MP3 Meltdown

I've tried using the *RealJukebox* and *MusicMatch* programs, but I'm experiencing problems with music from CDs that I've



If programs accessing your hard drive are taking up an inordinate portion of CPU cycles, check to see if DMA is enabled for the drive in question.

ripped. Sometimes there are pauses and skips of up to 10 seconds long in the songs. I feel like the problem is with my IBM Aptiva 2138-E96 PC, rather than with the software, since both programs have the same effect on my system. The pauses don't occur at the same place every time, and sometimes things go without a hitch. At other times, the frequent five to 15 second pauses make listening unbearable. I've tried shutting down my Norton *Systemworks* and other active programs, but that hasn't had any effect. Any ideas as to what could be causing this?

—Jim Nance

> **Since 64MB of SDRAM costs less than a copy of Daikatana, there's no excuse for being short on RAM these days.**

Any number of things can cause problems with MP3 playback, but the most common culprits are slow hard drive speeds, insufficient system memory, or an inadequate processor. Your Aptiva has a Pentium II 333MHz processor, which should be more than sufficient, so we'll concentrate on memory and drive speeds.

The first thing we recommend is that you defragment your hard drive. Since you have Norton *Systemworks*, you can defragment using *Disk Doctor* (be sure to turn on the option to defragment your swapfile). This should help increase your drive's streaming performance. After defragmenting, head over to Device Manager and enable DMA mode for your drives. The setting for DMA mode is under the hard disk's Settings tab (see screenshot).

We've also seen systems with 64MB of RAM, or less, suffer choppy MP3 playback. Since 64MB of SDRAM costs less than a copy of *Daikatana*, there's no excuse for being short on RAM these days.

DMA Don't Work

I'm having problems getting my computer to run in DMA mode. When I go into the Device Manager in Windows and enable DMA on the devices that allow it, the changes never stick. What I mean is, after setting it, I go back to see if my changes have been kept, and the DMA mode box is unchecked! Why can't I enable DMA mode?

—Vladan Milenkovic

In order for UltraDMA hard drives to function in DMA mode, both devices on an IDE chain need to support DMA transfers. If you have a non-DMA device, such as some CD-RWs, CD-ROMs, or Zip drives, on the same chain as the hard drive, try switching that device to the secondary IDE port on the motherboard. If the drive you move is the only device on the second chain, you'll need to change its setting from Slave to Master (see the drive's manual for more info). If you're running Windows 95, you may need to download updated IDE drivers from your mobo vendor's web site.

SoftFSB gives tweaking fanatics access to the frontside bus frequency of their PCs, even on older motherboards that don't allow access to such values.

SoftFSB—Huh?

So, what's the deal with *SoftFSB*? I've heard I can use it to force my motherboard to overclock its CPU, but I have no idea how to use it or where to find it. Please help me!

—Shirley Manamara

The FSB in *SoftFSB* stands for Frontside Bus. The program uses software instructions to alter the frontside bus speed of a PC. The program is popular because older PCs, and even some modern PCs, cannot be overclocked by adjusting the FSB in the BIOS or by moving jumpers on the motherboard. Thanks to H. Oda's popular utility, available at **www.h-oda.com**, overclocking is accomplished by simply choosing the target motherboard from a drop-down menu, letting the program determine its frontside bus speed, then manually adjusting the frontside bus speed until the desired speed is attained. Such steps are not necessary on more modern motherboards, since they're typically built to accommodate a variety of CPU types and allow the frontside bus frequency—and sometimes the voltage of the CPU—to be controlled through BIOS settings.

The program works by sidestepping the BIOS and passing instructions directly

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to a frequency controller chip, called a PLL-IC, on the motherboard. To overclock a modern Intel or AMD CPU with a frozen clock multiplier, *SoftFSB* instructs this chip to alter the frontside bus frequency. *SoftFSB* won't work on just any motherboard and CPU, however, and only five vendors currently supply PLL-IC chips to leading motherboard manufacturers (See links to PLL-IC vendors, below). To get the program to work, you must know your CPU type and motherboard model and correctly identify the individual PLL-IC that governs its frontside bus.

When you launch *SoftFSB*, you can browse the list of supported motherboards by clicking the Target Mainboard button.

"While SoftFSB is easy to use, it carries with it all the potentially serious consequences of overerclocking."

If you're stuck with, say, an Intel Seattle BX (SE440BX/BX2) motherboard, your best bet is to select from the list a board that you know uses the same chipset.

If you can't find your PLL-IC in the list of motherboards below, you'll need to poke around inside your case with a flashlight and inspect all the chips surrounding your CPU slot or socket. If your motherboard's PLL-IC isn't in the default *SoftFSB* list, check out the ICS plug-in list at the *SoftFSB* homepage or at Tweakfiles.com (**www.tweakfiles.com/processor/softfsbplugins.html**).

Once you've accurately matched a motherboard and PLL-IC controller, click the Get FSB option; if everything is a match, the *SoftFSB* frequency slider will activate itself. You can move the slider and click Set FSB to experiment with different overclocking frequencies. And remember—while *SoftFSB* is simple to use, it carries with it all the potentially serious consequences of overclocking

To find out about your CPU, its default voltage, and its clock multiplier, download and run *WCPUID*, available at H. Oda's SoftFSB site. Questions about *SoftFSB* or compatibility may be answered at these links:

- Download *SoftFSB* and PLL-IC plug-ins: **www.tweakfiles.com/processor/softfsb.html**
- Clocking and hacking the BX chipset: **http://arstechnica.com/cpu/2q99/bxhack/hacking-bx-5.html**
- CPU table of clock multipliers and voltages: **http://home.hawaii.rr.com/biosfear/survp2333.htm**
- List of motherboards with PLL-IC types and suggested *SoftFSB* settings: **www.rhrk.uni-kl.de/~dupont/boardlist.htm**
- Links to PLL-ICvendors: **www.nifty.ne.jp/forum/fextpup/common/link_pllic.htm**

second opinions

IRQ Steering Redux

Tsk, Tsk, Tsk... I just finished reading your advice to Bill Grasso in the July 00 Ask the Doctor, regarding his Monster MX300 soundcard and the IRQ Steering conflict. I think you went a little overboard. Before recommending disabling PCI IRQ Steering, which is a rather drastic solution, you should have told him to try switching PCI slots. I have a Monster MX300, and I too had the IRQ Steering problem until I swapped PCI slots with my Viper 550 videocard. I then removed the DOS driver line in my Auto-Exec.cfg file, and also dumped Diamond's crappy two-year-old drivers for the latest Aureal drivers, all with great success.

—Vern Earlywine

Thanks, Vern. Unfortunately, we weren't able to duplicate the exact problem that Mr. Grasso had—and frankly, we misunderstood his question. If your system is registering an actual conflict—that is, displaying an exclamation point next to the name of a piece of hardware in the Device Manager—and the conflicting piece of hardware is listed as IRQ holder for PCI Steering, then switching the slots, installing new drivers from Aureal's web site, and disabling the DOS Sound Blaster emulation is a good idea. But if the exclamation mark isn't there, there's no reason to be concerned about your soundcard sharing an IRQ with an IRQ holder.

FYI, at press time, Aureal's web site is unavailable, but drivers can still be downloaded from the site at http://support.aureal.com.

Bandwidth Blunder

In the July letter on DSL, I believe you incorrectly abbreviated the speeds for all of the listed interfaces. In all cases, the speeds are listed as Mbps, but the speeds given are for MBps speeds. PCI is listed as 133Mbps, Fast Ethernet is listed as 12.5Mbps, USB as 1.5Mbps, and Ethernet as 1.25Mbps. All of those speeds are divided down to the MBps speed, correct?

—Aaron Sanders

Good catch, Aaron. The speeds represent megabytes per second (MBps), but the units of measure were inadvertently changed to megabits per second (Mbps). Sorry for the confusion.

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REVIEWS

FOR THE FELLAS IN LOCKDOWN...

After publishing the fact that we had stacks of IT books collecting dust in the Lab, e-mail began pouring in from readers who wanted our throw-aways. Many letters were humorous, and some bordered on pathetic, but the most touching letters were from Arthur Kill State Penitentiary in New York (nice name for a prison, eh?). Prisoners "Andrew" and "Mark" wrote about their intentions to become IT professionals after paying their debts to society, and promised that our arcane networking manuals would greatly aid their pursuits. Hey, what can we say? These fellas seem genuinely committed to finding productive work once out of the Pen. Enjoy the books, guys. But, please, don't trade them for smokes.

—JOSH NOREM, REVIEWS EDITOR

Suck Synonyms

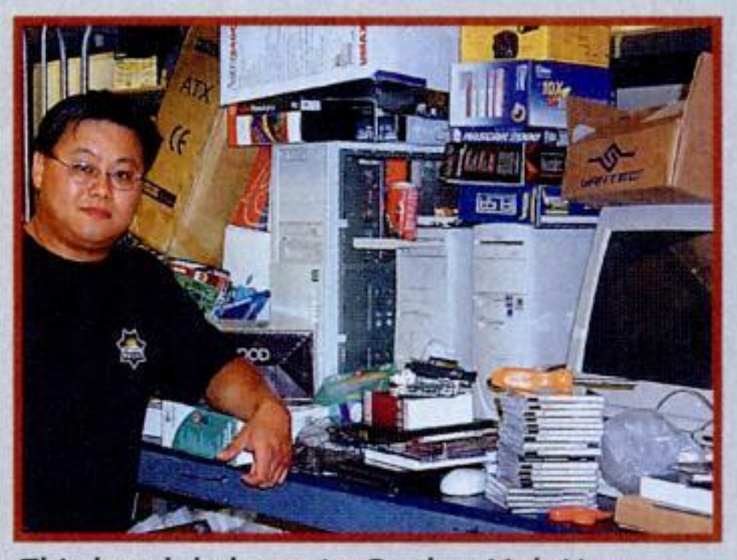
In the July 3 edition of the Daily Glitch, we asked readers to e-mail us their favorite synonyms for the word "suck." Our in-box hath runneth over with colorful alternatives. Readers suggest that bad products henceforth be described as: craptastic, craptageous, craptacular, supercrapafragilistic expealidocious, suckalicious, stercoraceous, biteous, mushy, wack, and wiggedy-wack. Of course, many readers suggested using names of products as synonyms for "suck," including: Windows, i820, and *Daikatana*. We also received a new logo for products that are craptastic to the nth power. Behold the Lick Ass award. (Thanks, Disposable Penguin.)

The Life of a Test Bench

Josh recently assumed the task of cleaning off a Lab test bench for our new technical editor, Will Smith. While cleaning the bench, Josh was struck by a hypothesis, which was quickly proved by a glance around the Lab. Could it be, Josh pondered, that a relationship exists between length of employment at *Maximum PC* and test-bench cleanliness?

Exhibit A is a virgin test bench. Will hasn't yet been inundated with vendor review products, so his bench is extremely clean. Will swears the bench will remain this way for the foreseeable future.

Next we come to the bench of Geoff Visgilio, who's neither a newbie nor a veteran. Geoff's bench is an excellent example of "mid-level test-bench disorder." Like Will, Geoff believes he'll keep the bench clean for some time to come.



This bench belongs to Gordon Mah Ung, who's been with the magazine since the beginning. As you can see, his formerly pristine bench has deteriorated into a hardware orgy that violates four fire codes.

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A behind-the-scenes look at the Maximum PC Lab and the gearheads who work in it.

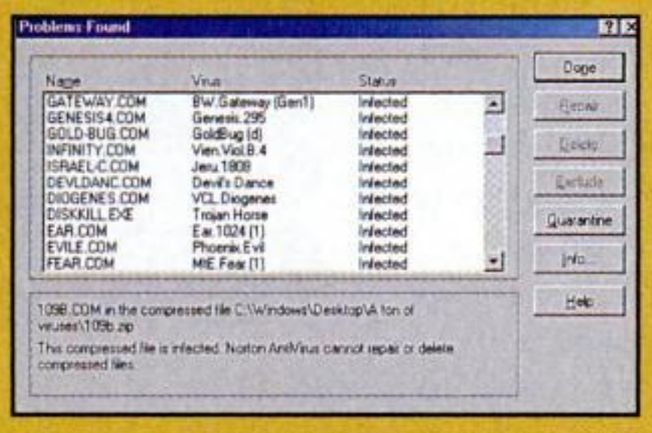
RIGHTEOUS LINK: WWW.FADDEN.COM/CDRFAQ

Despite its rather unassuming domain name and lackluster presentation, this site has more information about CD-R technology than you'll ever need to know. From explanations of the different types of media to the various Red/Yellow/Blue Book specifications, it's all covered in a clear, concise manner. There's even information about every single CD duplication program ever made, or so it seems. Trust us—if it involves CD-Rs, it's here.

CD-Recordable FAQ

virus infestation

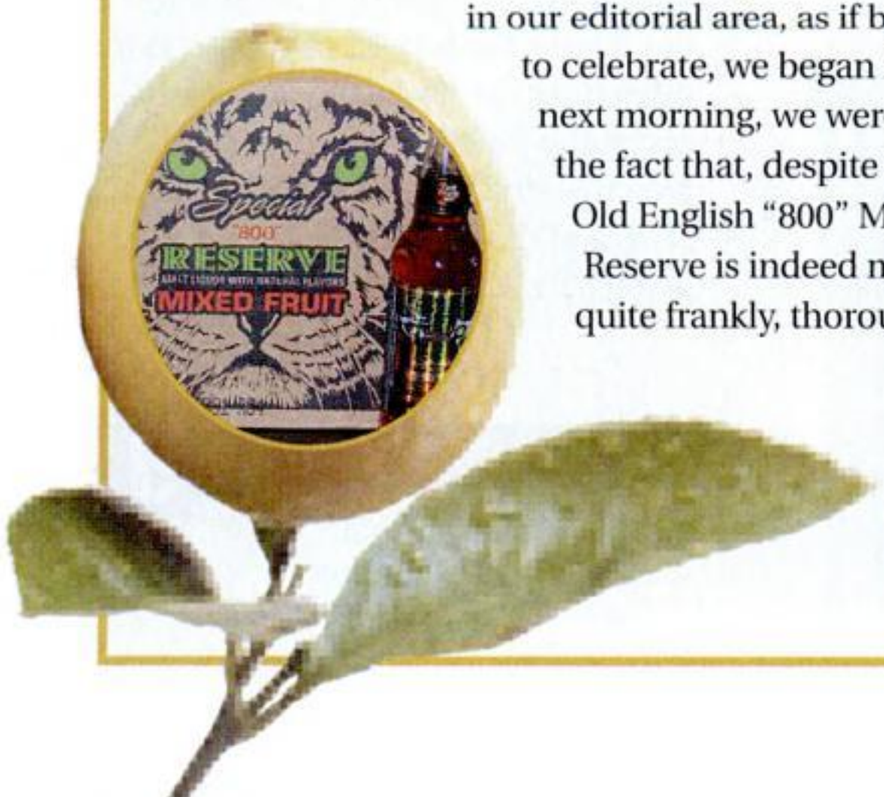
We all use antivirus protection, but are virii really dangerous? To find out, we executed 100 viruses on an unprotected test machine and examined the aftermath. The majority of the viruses were .EXE and .COM files, with a few evil *Word* macros thrown in for good measure.



The first 40 or so viruses seemed to cause no real problems, but when we opened a file named Natas.EXE, all hell broke lose. The test machine immediately locked up, forcing us to reboot. Then we were informed that the Command.com file was corrupted or missing—not good. We attempted emergency resuscitation with a Windows boot disk, replacing the Command.com file on our hard drive with the file from the boot disk, which didn't do jack squat. Apparently, the sectors on our hard drive had been turned into scrambled eggs, so we reinstalled Windows, to no avail. Eventually, we were forced to FDISK—including the MBR—and reinstall Windows. Don't try this at home kids—we're trained professionals.

Lemon of the Month

After we put the August issue to bed, a case of Old English "800" Mixed Fruit Special Reserve appeared in our editorial area, as if by magic. Eager to celebrate, we began imbibing. The next morning, we were reminded of the fact that, despite its fruity flavor, Old English "800" Mixed Fruit Special Reserve is indeed malt liquor, and, quite frankly, thoroughly biteous.



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Benchmarking: Full Disclosure

Visit **www.maximumpc.com/benchmarking** for the complete lowdown on *Maximum PC*'s benchmarking strategies.

16 PRODUCTS REVIEWED!

Hardware

- Polywell Poly A30k7-1000 system . . . **70**
- Diamond Rio 600 MP3 player **72**
- Hercules 3D Prophet II 64MB graphics card . . . **74**
- Elsa Gladiac GeForce 2 32MB graphics card . . . **74**
- Hercules 3D Prophet II 32MB graphics card . . . **74**
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- StarLancer **86**
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Polywell Poly A30K7-1000

WE'RE THUNDERSTRUCK

The Thunderbird's performance is as blinding as the chrome adorning the front of the Polywell case.

When the AMD Athlon debuted, it whipped the Pentium III Katmai's silicon heinie. This made Intel extremely unhappy, so the number-one chipmaker struck back with the Coppermine processor. With its full-speed L2 cache, the Coppermine effectively ended the Athlon's reign of upstart terror. But in early July, AMD released its response to the Coppermine: the Thunderbird core. Officially described as an "Athlon processor with performance-enhancing cache memory," Thunderbird brings full-speed L2 cache to the Athlon architecture, delivering astonishing performance compared to previous Athlons, and enough of an edge over Coppermine to make Intel nervous.

Eager to see how the Polywell box (**www.polywell.com**) would perform compared to first-gen Athlon systems, we began competitive benchmarking posthaste. First-generation Athlon technology was represented by the Alienware Area 51 machine that we reviewed in the July issue. In this 1GHz battle of the Brothers Athlon, the Polywell dominated the Alienware decisively.

Let's talk *SYSmark*—the Polywell outpaced the Alienware by an incredible 15 points. But that actually seemed like a minor victory when we saw the two systems' scores in our *bootMark* test. Are you ready for this? The Polywell beat the Alienware by 100 points. One-zero-zero. 'Nuff said.

The Polywell also offers avant garde hard drive technology. We're talking an ATA/100 RAID array defined by dual 46GB IBM hard drives, and a Promise FastTrak controller card. The two drives are striped—RAID 0, if you please—and in the *HD Tach* benchmark, they produced an average read speed that was literally off the charts (the benchmark maxes out at a 60MB/sec average read speed, and while reading through the first 30GB of data, the drives exceeded this ceiling). Across the entire disk array, the drives topped out at a record-setting 38.6MB/sec average read speed, and achieved burst speeds of 84MB/sec.

Besides whomping the first-gen Athlon system, the Polywell also outclassed 1GHz P-III Coppermine machines. The Polywell beat both the HP Pavilion (reviewed in June) and the Dell Dimension (reviewed in this issue) by narrow margins in *SYSmark*, and trounced both machines by over 50 points in *bootMark*. The Polywell rung up another record-breaker in Adobe *Photoshop*, and achieved gaming scores on par with those of the Alienware, thanks to its GeForce 2 GTS videocard.

Despite all this CPU and hard drive power, the Polywell's speakers, monitor, onboard audio and optical drives are merely average. And of the Polywell's silver case with chrome buttons, we can only say, "Beauty is in the eye of the beholder."

All in all, the Poly is a fast system that yields incredible scores in the most-demanding categories: *SYSmark*, *bootMark*, *HD Tach*, and *Photoshop*. But it lacks the lust-list of components offered by the Alienware, and that cost it the Kick Ass award. With a dreamworthy speaker system, soundcard, and CD-RW, you'd have a perfect 10.

—Josh Norem

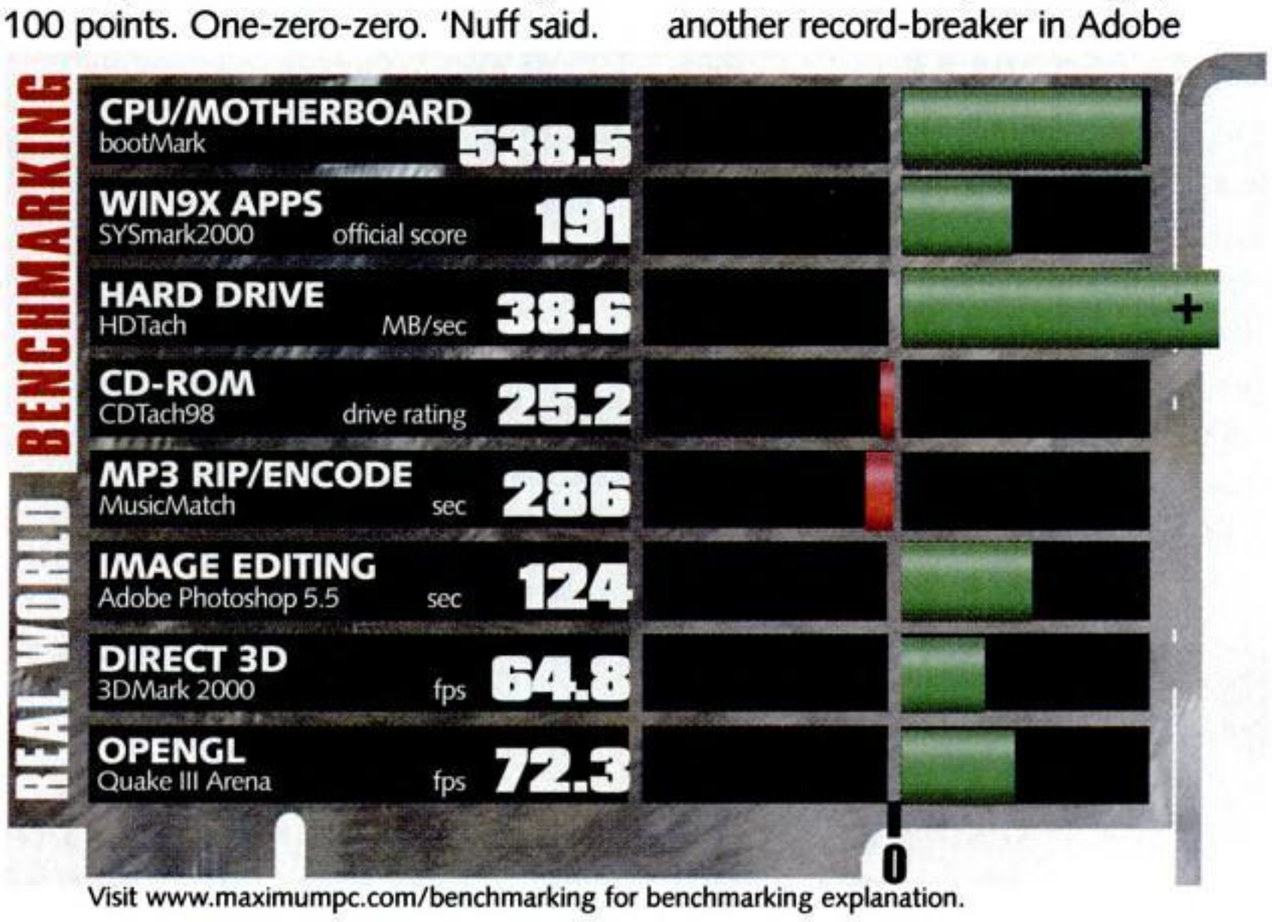
UNDER THE HOOD

THE BRAINS	
CPU	1GHz AMD Athlon Thunderbird
L2 Cache	256K full-speed
RAM	256MB PC133 SDRAM (1.5GB max)
Motherboard	MSI K7T Pro, VIA KT133 chipset
Drive Bays	Three 5.25-inch (one free), Four 3.5-inch
I/O Ports	Two PS/2 | Two USB | Two serial | One parallel | Gameport
DISPLAY	
Video	Leadtek Winfast GeForce 2 GTS 32MB DDR SDRAM
Monitor	19-inch Viewsonic GS790 (18-inch viewable, 0.26mm dot pitch)
Refresh@ Max Res	72Hz@1600x900
STORAGE	
Hard Drive	Two 46.1GB IBM 75GXP, 7,200rpm in RAID 0
DVD	Toshiba SD-M1402 12x
CD-RW	Sony CRX140E 8/4/32
Removable	Iomega ZIP100, Floppy
NETWORKING	
Fax/modem	56kbps Lucent winmodem
SOUND	
Soundcard	VIA(R) VT686A integrated AC97' audio controller.
Speakers	Aiwa SC-C57
MISC	
Promise FastTrak100 RAID PCI controller	
THE BUNDLE	
Cyberlink *PowerDVD*	

BOOT 1:05 DOWN 0:01

PLUSES
- 1GHz T-bird is a barnburner
- Incredible hard drive throughput
- Love the GeForce 2

MINUSES
- Speakers are a joke
- Onboard audio is a slap in the face
- Optical drives are fast, but not the fastest
- Robotic-looking case is an acquired taste



Visit www.maximumpc.com/benchmarking for benchmarking explanation.

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EXPANSION NOTES

The four free PCI slots, tight wiring, and a roomy case make upgrades painless. There's only one free drive bay, but we're not complaining.

EXPANSION MAP

AGP:	GeForce 2
PCI:	Free
PCI:	Modem
PCI:	Free
PCI:	Promise Controller
PCI:	Free
PCI:	Free

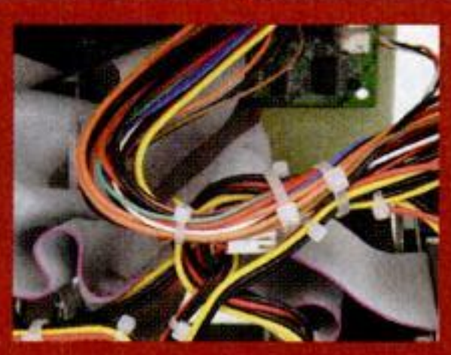
IRQS

00 System Timer	Steering
01 Keyboard	**09** USB Controller
02 Program Interrupt	**10** IRQ Holder for PCI Steering
03 COM 2	**11** Promise Controller
04 COM 1	**12** PS/2 Mouse
05 IRQ Holder for PCI Steering	**12** PS/2 Mouse
05 Lucent Winmodem	**13** Numeric Data Processor
05 VIA PCI audio	**14** Primary IDE Controller
06 Floppy Port	**15** Secondary IDE Controller
07 Printer Port	
08 System CMOS	
09 IRQ Holder for PCI	

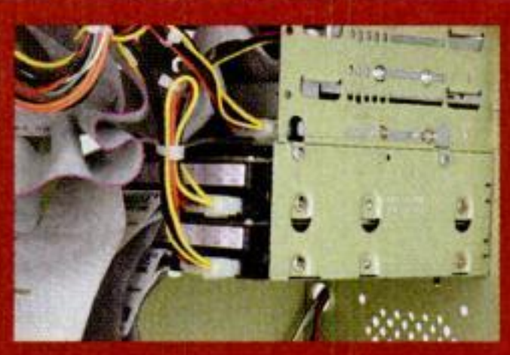
DMAS

02 Floppy	**04** DMA Controller

Hooray for Socket A! AMD's "enhanced" Athlon features 256K of full-speed cache, a 64-bit-wide data path, 37 million transistors, and either copper or aluminum interconnects.



That's a wrap, folks. There's so much free room in this case, we could probably rent it out in San Francisco as an in-law apartment. Said space is made more ample by Polywell's tidy bundling of power connectors.



RAID to the rescue This ATA/100 RAID array destroyed our previous *HD Tach* record. The 46GB IBM 75GXP drives are connected to a Promise FastTrak100 RAID PCI controller.

The Optimus Prime Case Say what you will about Polywell's custom case, but after testing one OEM PC after another, we enjoy something different. The staff was divided on whether this case was cool or incredibly cheesy.

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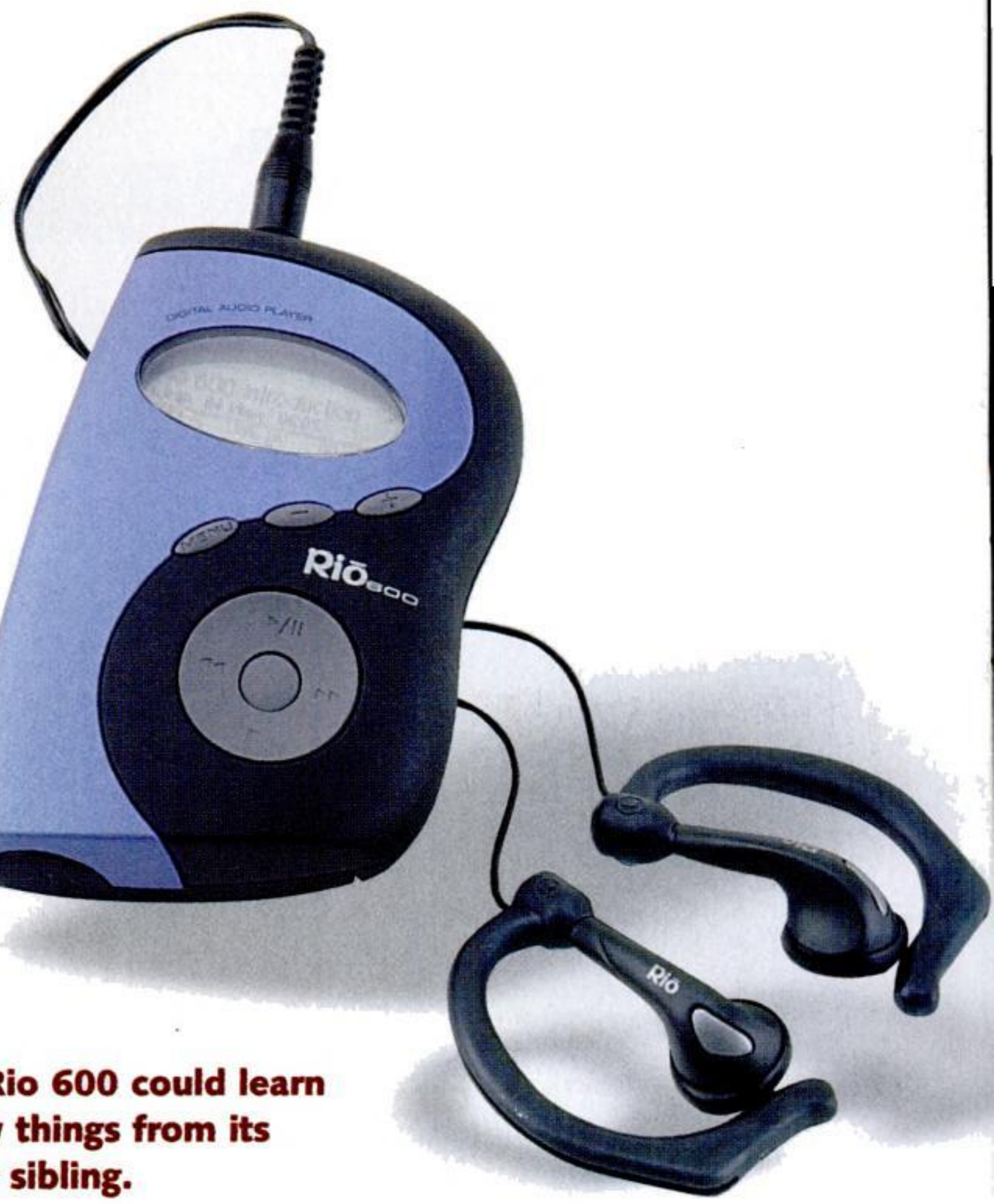
S3 Rio 600

LOUDER, BUT NOT BETTER



The Rio 600 could learn a few things from its older sibling.

Marcia, Marcia, Marcia! You remember how Jan Brady's groovy older sister got all the attention, won all the awards, and was generally better liked (and if you don't, pretend you do, because you're making us feel old)? The minute we got the Rio 600 into the Lab, it was like we'd been transported to the backseat of the Brady Bunch's woodpaneled stationwagon, because despite its age, the Rio 500 is a better MP3 player than its younger sibling. That's right—the Rio 600 is the Jan Brady of MP3 players.

PLUSES
- Gets almost painfully loud
- Large LCD
- WMA support

MINUSES
- Proprietary storage media
- No FM tuner or voice recorder
- Buggy software

Granted, the 600 is firmware upgradeable and supports MP3 and WMA files out of the box, but its list of enhancements is superficial. Perhaps most pathetic is that the onboard memory allocation has been reduced (!) to 32MB—the 500 boasts 64MB onboard and typically costs just $20 more per unit. And forget about buying more FlashMedia and adding it to an external slot—the 600's storage comes in a "memory backpack" that snaps onto the back of the unit. Of course, the backpacks are only available from S3, at what we consider to be a steep price. The backpack should make it easier to take advantage of future storage options, including the IBM MicroDrive, but until those are available, FlashMedia is the order of the day.

THE SPECS

BITRATES SUPPORTED
Constant up to 320Kbps, variable

ADD-ON OPTIONS
FM tuner | car adapter | colored faceplates | memory backpacks: $100for 32MB $200 for 64MB

BUNDLE
Rio Audio Manager | ear-bud headphones | AA battery

BATTERY LIFE
8-10 hours

One area in which the 600 bests its older sibling is volume. Unlike other players we've used, the Rio 600 gets loud. *Really* loud. Unfortunately, sheer volume seems to have taken priority over tonal warmth and richness. The 600's sound quality is definitely inferior to that of its older sibling, and Creative Labs' Nomad II. The customizable bass and treble settings offer some control over the sound contour, but don't add the fullness we're looking for.

The 600's svelte, grippable shape and rubbery coating are easy on the eyes and hands, and the shell's faceplate snaps off and can be replaced with others in different (currently unannounced) colors—a nice touch, though the 600 seems to favor form over function. Where's the thumb-nub wheel that made the 500 easy to operate with one hand? In its place is a Menu button that controls the relatively useless EQ settings and playback options. The Fast Forward and Rewind buttons live on a circular disc that frames the equivalent of an Enter button, which we kept accidentally hitting instead of the Stop button. Confused? So were we.

To S3's credit, the 600's software, *Rio Audio Manager*, has a more streamlined interface than the 500's, but it's as clumsy to use as the previous version was. Tell it to search your hard disk for playable files and it imports *every* multimedia file on your hard disk. Every AVI file. Every sound file from every game. *Everything*. And the unwanted files must be ditched one at a time—there's no option to shift-click and select multiple files. We liked the option to play any kind of multimedia file, but were frustrated by *Rio Audio Manager's* not-so-fine finer points.

We denied the Rio 500 a Kick Ass because it lacked an FM tuner, and we're going to fault the 600 because it lacks as standard features the FM tuner and voice recorder that adorn the Nomad II, arguably its closest competitor. We're told that omitting those features as standards keeps the 600 at a low price. That makes good business sense, but it doesn't lessen our disappointment that the leader in portable MP3 technology failed to make serious strides in its next-generation product.

—Kristen Salvatore

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GeForce 2: Part Deux

EVOLUTIONARY, NOT REVOLUTIONARY

3D PROPHET II 64MB

PLUSES
- Fastest 3D, period
- Future proof
- Memory heatsinks
- TV-out and DVI connectors

MINUSES
- same old reference drivers
- TV-out ain't all that great
- Expensive

3D PROPHET II 32MB

PLUSES
- Fastest 3D, period
- Memory heatsinks
- TV-out

MINUSES
- same old reference drivers
- TV-out ain't all that great

GLADIAC 32MB

PLUSES
- Fastest 3D, period
- Price
- Nifty monitor database

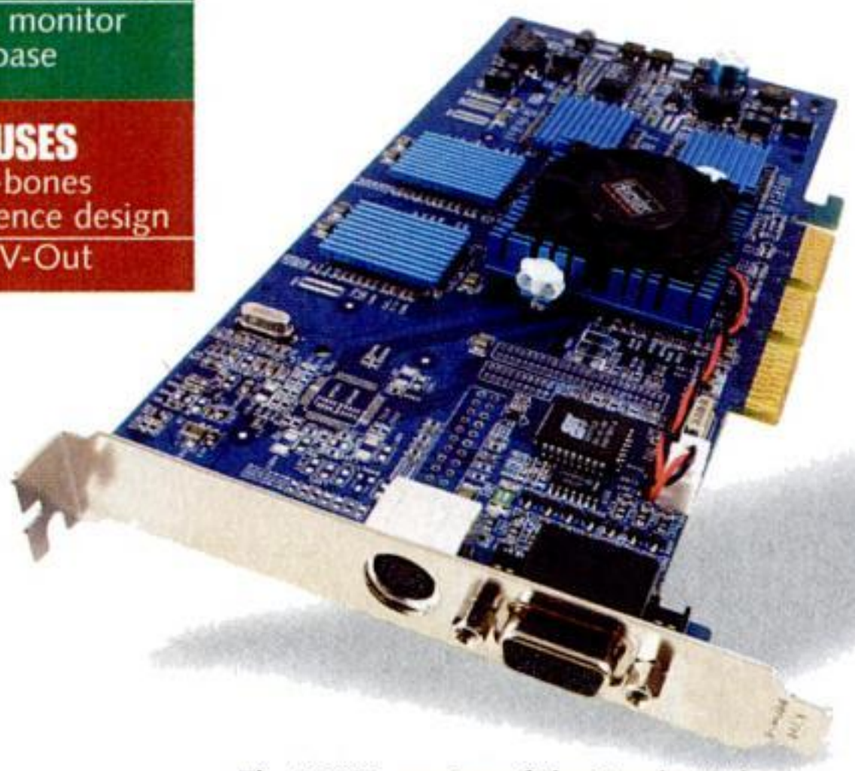
MINUSES
- Bare-bones reference design
- No TV-Out

Since our look last month at the Creative Labs Annihilator 2 videocard, the hardware elves have been hard at work. This month, we broaden the GeForce 2 GTS field with entries from the usual suspects: the **Elsa Gladiac 32MB (www.elsa.com)**, the **Hercules 3D Prophet II GTS 32MB**, and the **Hercules 3D Prophet II GTS 64MB (www.hercules.com)**. All three deliver performance comparable to the Annihilator 2's, but each is wrapped in its own distinctive candy shell.

First, a chipset primer: The GeForce 2 takes up the mantle of the original GeForce as the fastest damn 3D accelerator available. With its 0.18-micron core running at 200MHz paired with 166MHz DDR SDRAM to drive its four pixel pipelines, you can safely expect a benchmark blowout. The GeForce 2 also features a second-generation T&L engine, which should boost frame rates and detail in T&L-enabled games such as *MDK2*. With a GeForce 2-based card in your system, you can rest assured that your investment will reap speed dividends into the future.

The only downside to the GeForce 2 craze is that the standard 166MHz DDR SDRAM on GeForce 2 boards, which effectively runs at 333MHz, chokes on the massive amount of information that the 25 million transistor core can crank out. This creates a nasty bottleneck in the memory pipeline and keeps the cards from reaching their full potential, capping their performance at a level just slightly higher than that of GeForce 256 DDR boards.

With 64MB of onboard RAM, the Prophet II 64MB is absolutely massive.



The 32MB version of the Prophet II has the same nifty blue styling as its bigger brother, and memory heatsinks to boot.

Deciding which GeForce 2 board to buy is more a matter of features and price than of performance. Ask yourself what you need in a shiny new 3D accelerator. 64MB of RAM? S-video output for TV gaming? DVI for that special flat-panel feeling? Heatsinks on the RAM to facilitate your overclocking compulsion? Price? If your answer is "all of the above," expect to make some tough decisions, because no single card reviewed here offers all of these features.

Once upon a time, TV-out was an expensive option that you paid for only if you absolutely *had* to be able to play games or browse the web on your TV. These days, more cards support S-video-out, but the feature is by no means a sure thing, and image quality ranges from excellent to near pathetic. Both Hercules cards reviewed here will pipe mediocre low-resolution screens out to your TV; unfortunately, they don't allow you to use the monitor and TV-out at the same time. If big-screen gaming is your bag, scratch the Elsa Gladiac off your list because it ships without TV-out support.

Because the GeForce 2 offers fast frame rates at high resolutions, gaming on LCD flat-panel displays is suddenly viable. LCDs will display only their native resolution effectively; if you run games at a non-native resolution, you'll receive a nasty, dithered mess. GeForce 2-based cards are the first 3D accelerators fast enough to run those newfangled 3D games at 1024x768, the native resolution of most flat panels. So, if you own a flat panel and are into gaming, the 64MB Hercules Prophet II is your card.

In the land of drivers, where everything is *always* green and happy, Elsa shines. While Hercules was content to simply repackage the nVidia reference drivers, Elsa includes its own monitor database, which recognized our test machine's monitor and settings when Windows 98 didn't. Sadly, the latest Elsa drivers that we downloaded from the web didn't install properly, but by using *WinZip* to unzip the executable and installing the driver the old-fashioned way, we were able to get the card working.

For the overclocker in us all, Hercules was thoughtful enough to add small heatsinks to each RAM chip on its boards. This should

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facilitate overclocking the memory bus—thus ameliorating the memory bottleneck to a small degree—but since Hercules had to release a BIOS update to lower the clock speed of the memory on its 64MB boards, we question the real-world value of the heatsinks.

All the amenities that these cards provide are really just complements to the raw, unbridled performance of the GeForce 2 chip itself. As you'd expect from cards that are based on the same design, there weren't any surprises in the performance department. It's worth noting that the 64MB card doesn't show any appreciable speed increase, except in the *Quake III* Quaver benchmark, which uses more than 32MB of textures at high quality. We assure you that we didn't choose the Hercules 64MB Prophet II for the 2000 Dream Machine because of its pretty blue PCB; we chose it because a 64MB card won't suffer the indignity of using system RAM over the AGP bus when games that require more than 32MB of memory are released this winter. Of course, you can expect to pay a premium for that kind of obsolescence-protection, and the 64MB Hercules is by far the most expensive card in our roundup.

If you're looking for a bare-bones but blazingly fast videocard, the Gladiac 32MB is your best bet.

Whether you choose to purchase a GeForce 2-based card depends mostly on your current videocard situation. GeForce DDR owners need not bother, but anyone with a pre-GeForce card will dig the juiced frame rates that onboard T&L and four pixel-pipelines provide. Owners of DDR GeForces are better served by waiting for cards with faster memory, since both the older GeForce 256 DDR and the GeForce 2 suffer from the same memory bottleneck. Whether you go with the Hercules Prophet II 64MB for its 64MB of RAM and DVI output, the Elsa Gladiac 32MB for its bare-bones implementation, or the Hercules Prophet II 32MB for its TV-out and memory heatsinks, you won't regret acquiring a GeForce 2.

—Will Smith

THE SPECS

AGP SUPPORT	Full AGP 2x/4x with fast writes
RAMDAC	350MHz
MAX 32-BIT RES	2048x1536
MAX 16-BIT RES	2048x1536
REFRESH RATE	1600x1200@85Hz
CLOCK SPEED	200MHz bus/166MHz memory

3D PROPHET II 64MB — 9

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3D PROPHET II 32MB — 8

$299 | Hercules/Guillemot
Buy www.SeeMeBuyMe.com
877.751.7467 ID#0929

GLADIAC 32MB — 8

$329 | Elsa
Buy www.SeeMeBuyMe.com
877.751.7467 ID#0930

DARE TO COMPARE

MANUFACTURER	CREATIVE LABS ANNIHILATOR 2	3D PROPHET II 32MB	3D PROPHET II 64MB	GLADIAC 32MB
Local Memory	32MB DDR SDRAM	32MB DDR SDRAM	64MB DDR SDRAM	32MB DDR SDRAM
Added Features		TV-out Memory heatsinks	DVI output TV-out Memory heatsinks Monitor database	Monitor database
Bundled Software	Win9x/NT4/ 2000 drivers, E-Color *Colorific* and *3Deep*	Win9x/NT/ 2000 drivers	Win9x/NT/ 2000 drivers	Win9x/NT4/2000 drivers Windows utilities

BENCHMARKS	CREATIVE LABS ANNIHILATOR 2	3D PROPHET II 32MB	3D PROPHET II 64MB	GLADIAC 32MB
Driver Version	5.22	5.22	5.22	5.22
Quake III demo001 1024x768 32-bit color	53.8fps	55.8fps	57.0fps	**61fps**
Quake III Quaver 800x600 32-bit color	54.6fps	58.1fps	**76.0fps**	59.8fps
*MDK2** 800x600 32-bit color	76.5fps	**102.4fps**	102fps	**103fps**
Expendable 1024x768 32-bit color	74.9fps	74.9	76.1fps	**76.2fps**
*3DMark*2000 game1-medium 1280x1024 16-bit color	67.7fps	68.4fps	68.0fps	**70.1fps**
*3DMark*2000 game 1-medium 1280x1024 32-bit color	37.9fps	39.3fps	**42.1fps**	42.0fps
*SYSMark*2000 Graphics Apps 1600x1200 16-bit color	593	604	603	**608**
Max Refresh at 1280x1024	100Hz	100Hz	100Hz	100Hz

NOTES: Benchmarked on our Dell 733MHz Pentium III test system using version 5.22 of the Hercules drivers and Elsa version 4.12.01. The v4.12.01 BIOS update was applied to the Gladiac, and the 2.15.01 BIOS update was applied to the Prophet II 64MB. **Bold** indicates the best benchmark score.
* The Annihilator 2 was tested in MDK2 with vsync enabled and the monitor refresh set to 75Hz. All the other cards were tested with vsync enabled and the refresh rate set to 120Hz

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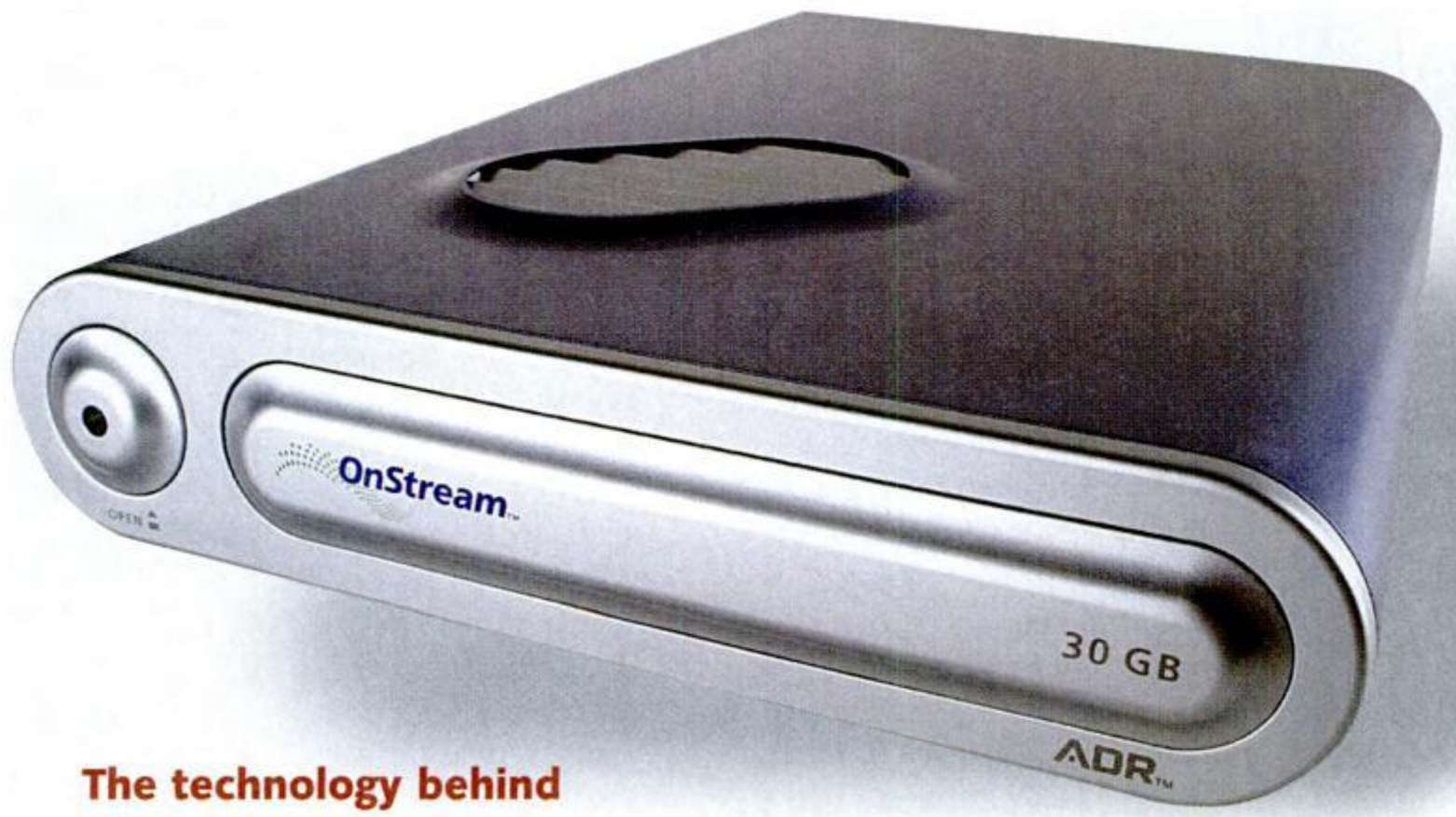
OnStream 30GB Tape Drives

EIGHT-TRACK TAPES ALMOST MAKE A COMEBACK

OnStream (**www.onstream.com**) has produced one of the first truly affordable tape-backup solutions for home users. Unfortunately, while the hardware is ingenious, the software required to use the damn thing suffers from a host of glitches that soured our experience.

We tested two versions of the OnStream Tape Drive: an internal IDE version and an external USB version. Both operate via an Advanced Digital Recording (ADR) system that uses an eight-channel array to work with up to eight tracks of data simultaneously, reading and writing data onto modified eight-track tapes. That's right, eight-track tapes. But don't put on your boogie shoes just yet—OnStream's cartridges are much smaller than the audio eight-tracks of yesteryear, hold 30GB apiece, and will probably never serve as a conduit for Barry Manilow's Greatest Hits. They also boast some real advantages over tape drives of the past.

First, OnStream trumpets superior reliability. Passing tape through magnetic recording heads increases the chance of read/write errors, but unlike older tape drives that install error correction code horizontally across the tape, the OnStream ADR drives distribute code horizontally *and* vertically, for extra protection. And unlike tape backup systems such as DAT, ADR drives have fewer moving parts for the tape to pass through. This results in less wear on the tape and on the drive's hardware. Finally, OnStream's servo system, which operates much like the rollers on a VCR, keeps the tape in line with the head, preventing



The technology behind OnStream's 30GB tape drive is solid, but the same can't be said of its software.

the tape from wandering and causing read/write errors. All of this amounts to a quieter drive and fewer chances for errors when backing up data.

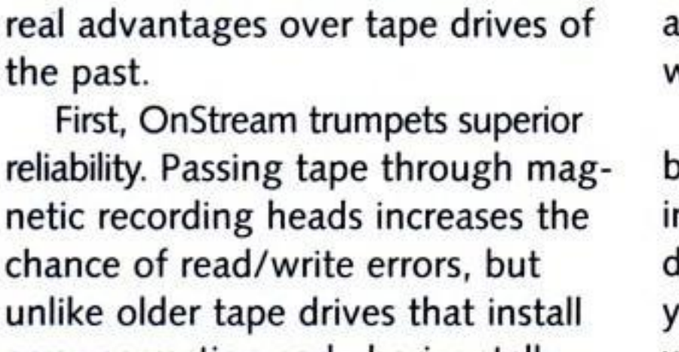
Installation was a cinch with both the IDE and USB versions. The included *Echo* software assigns the drive its own drive letter, allowing you to drag and drop files as you would with a second hard drive. It also lets you automate a hard drive backup. We found that to be a very useful feature, because after the easy-breezy hardware installation, our test system began acting seriously unstable.

First, there was a tiff between the OnStream drive and our antivirus software. *McAfee's* virus protection uses a realtime monitoring system to check the status of transferring files, and it wreaks havoc with the *Echo* software, slowing down transfers from a fairly zippy 1MB per second to a pokey 1.3MB per *minute*. The *Echo* software doesn't play nice with Norton's *Antivirus 2000* either, and repeatedly caused our test system to hang on shutdown.

We also had trouble using Windows Explorer to drag and drop files from the OnStream drive to our hard drive. You see, OnStream tapes aren't actually 30GB; they have a true capacity of 15GB, and use a time-consuming 2:1 compression method to crunch data down, so that a total of 30GB can be stored on one tape. Windows Explorer's directory structure differs from *Echo's* data-compression and storage method, forcing the tape to jump all over the place in order to follow Explorer's pattern. This resulted in lengthy lag times, turning a 180MB transfer that should take about five minutes into a 20 minute bore-a-thon.

OnStream's technology is sound—transferring data onto its media averaged about one gigabyte per 20 minutes—but its software issues are a serious drawback. When your precious data is at stake, do you really want to take a chance on twitchy software?

—Geoffrey Visgilio



The Echo Express panel puts all backup operations at your fingertips.

PLUSES
- An affordable 30GB of storage
- Cheap media
- ADR technology minimizes data corruption

MINUSES
- *Echo* software has problems
- 2:1 compression method is slow

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Dell Dimension XPS B1000r SE

DV SYSTEM MISSES ITS CUE

Dell's DV system seems like a 1GHz box with a FireWire card thrown in as an afterthought.

PLUSES
- 1GHz power for DV crunching
- Canon ZR-10 camcorder is included

MINUSES
- Same old Dell case
- So-so components
- No *Premiere*
- Very expensive

It's a shame that the first 1GHz system we received from Dell came under the guise of a digital video studio. As a stand-alone system, the XPS B100r (**www.dell.com**) is fairly impressive. But as a digital video system, it falls woefully short of the mark. Did Dell throw together the DV components at the last minute, then call it a wrap?

The XPS B100r includes Dell's exclusive 64MB DDR GeForce, as well as the big-and-bad 40GB Maxtor DiamondMax Plus ATA/66 hard drive—the same drive found in the two DV systems we tested in the August issue. Surprisingly, Dell includes room in the XPS B100r for a second hard drive, and a free PCI slot for a RAID controller, but does nothing with this open real estate. This is yet another similarity between this system and the DV systems we reviewed last month. It seems to us that a DV system should have all the accoutrements—especially a DV system from Dell, a vendor renown for its thorough configur ations. There isn't even a Zip drive, damnit! Trading small files and sound clips is an integral part of a DV maven's day, and it's sad to see such a simple addition overlooked.

Dell went with a generic FireWire capture card that's outclassed in speed and capability by even low-end offerings from Pinnacle and Canopus. And the only DV software included is MGI's *VideoWave III*, an entry-level DV package that's competent but insufficient for an experienced DV user. *VideoWave III* just doesn't offer the robust editing power found in software from Adobe or Puffin Designs. In its defense, *VideoWave III* does support a variety of capture cards, so if you decide to upgrade your hardware in order to take advantage of the software's MPEG-2 support, you're good to go. Then again, if you're so advanced that you're looking at new MPEG-2 cards, you've already outgrown *VideoWave*, and will most likely be upgrading the software as well. In any case, it's a mystery why Dell didn't include Adobe *Premiere*, the de facto industry standard for video editing.

To its credit, Dell does equip the XPS B100r with a Canon ZR-10 digital camcorder, making it the first vendor we've seen to ship a DV system with—gasp!—a DV camera. Common sense prevails, finally. And unlike the system's generic capture card, the ZR-10 camera is a quality product, sporting a 1/4-inch CCD with a 290,000 effective pixel pickup, image stabilization, and a 10x optical and 200x digital zoom.

The 1GHz Coppermine processor is truly the crown jewel in this system. Unfortunately, its shine is diminished by the commonplace components surrounding it. Let's face it: A 1GHz system is intended for prosumers and people who will actually use the power behind the proc. Perfect for the DV audience, right? Right. So why the cheap capture board and beginner software package? It's mindboggling that Dell built a machine that screams for an upgrade right out of the box, especially at this price. Oh well—at least it comes with a camera.

—Geoffrey Visgilio

UNDER THE HOOD

THE BRAINS	
CPU	Intel Pentium III 1GHz
L2 Cache	256K on-die
RAM	128MB Direct RDRAM (512MB max)
Motherboard	Intel Vancouver, 820 chipset
Drive Bays	Two 5.25-inch (none free), Four 3.5-inch (three free)
I/O Ports	Two USB | One serial | One paralle | PS/2
DISPLAY	
Video	Dell branded nVidia GeForce 256 with 64MB DDR SDRAM
Monitor	19-inch Dell P991 (Sony Trinitron, 17.9-inch viewable, 0.25mm dot pitch)
STORAGE	
Hard Drive	40GB Maxtor 54098U8, ATA/66, 7200rpm
DVD	12x NEC DV-5700A DVD-ROM
CD-RW	Sony CRX140E CD-RW (8x4x32x)
Removable	Floppy
NETWORKING	
Fax/modem	3Com V.90/56k PCI Telephony Modem
NIC	3Com 3C905C-TXM 10/100 WuOL NIC
SOUND	
Soundcard	Sound Blaster Live! Value 512v card
Speakers	Harmon Kardon HK-595 multimedia speakers
THE BUNDLE	
MGI *VideoWave III* | Adaptec *Easy CD Creator 4* | Buena Vista Interactive *Who Wants to Be a Millionaire* 2nd Edition | Microsoft *Works* | Microsoft *Home Publishing 2000* | Microsoft *Money* | Microsoft *Street and Trips 2000*	

BOOT 1:10 DOWN 0:02

REAL WORLD BENCHMARKING

CPU/MOTHERBOARD bootMark		490.2
WIN9X APPS SYSmark2000	official score	186
HARD DRIVE HDTach	MB/sec	28
CD-ROM CDTach98	drive rating	26.4x
MP3 RIP/ENCODE MusicMatch	sec	188
IMAGE EDITING Adobe Photoshop 5.5	sec	127
DIRECT 3D 3DMark 2000	fps	57.3
OPENGL Quake III Arena	fps	48

0

Visit www.maximumpc.com/benchmarking for benchmarking explanation.

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$4,447; $4,017 without 19-inch monitor; $3,550 without camera | Dell
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EXPANSION NOTES

The first thing we'd do is dump that no-name capture board and replace it with something by Canopus or Pinnacle. And that open slot for a second hard drive is just begging for a RAID array. Of course, a Zip drive would round out our DV expansion.

EXPANSION MAP

AGP: GeForce Card
PCI: NIC Card
PCI: FireWire Capture Card
PCI: Free
PCI: Sound Blaster Live! Value Card

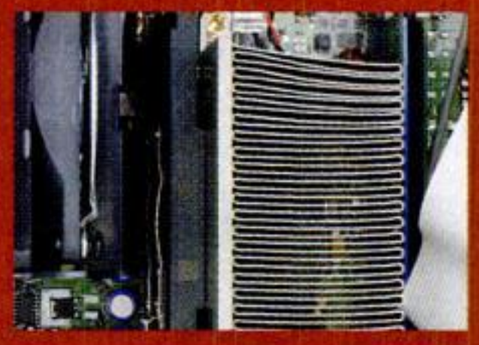
IROS

00 System Timer
01 Keyboard
02 Interrupt Controller
03 IRQ Holder
04 COM 1
06 Floppy Port
07 LPT1 Printer Port
08 System Clock
09 IRQ Holder/USB Host controller/ SB Live! Value/ SCI IRQ by ACPI Bus
10 IRQ Holder/Bus Controller/IEEE 1394 Controller
11 IRQ Holder/nVidia DDR GeForce
12 PS/2 Mouse
13 Num Data Proc
14 Bus Master IDE Controller/ Primary IDE Controller
15 Bus Master IDE Controller/ Secondary IDE Controller

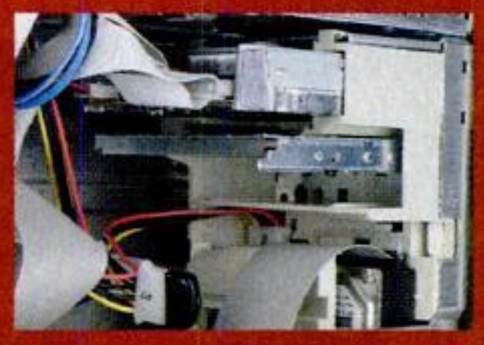
DMAS

01 SB16 Emulation
02 Floppy Disk Controller
04 DMA Controller
05 SB16 Emulation

It's about time! Finally, a DV system with a DV camera. The Canon ZR-10 camera boasts a 1/4-inch CCD with a 290,000 effective pixel pickup, as well as a 10x optical and 200x digital zoom.



Behind the scenes. To crunch DV, you need one thing and one thing only: serious processor power. That's about the only thing the XPS B100r has in spades. This system is powered by a P-III Coppermine running at 1GHz.



Why didn't they do it? Dell provided a slick carriage for the second hard drive and a free PCI slot for a RAID controller, but failed to add either component. It's possible that the $900 camera made the prospect too pricey.

Same old Dell. Dell has been using the same case for so long, we're running out of things to say about it. Hey, Dell, it's time for a new look.

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DVD/CD-RW combo mambo

DUAL-LASER DRIVES DO DOUBLE-DUTY

If you've got just one free drive bay but want CD-RW and DVD, one of these drives is the way to go.

SAMSUNG

PLUSES
- High quality audio extraction
- Works with *Clone CD*
- Overburns
- Plays movies

MINUSES
- 100% CPU utilization

TOSHIBA

PLUSES
- High quality audio extraction
- Plays movies

MINUSES
- No support for *Clone CD*
- 100% CPU utilization

The Samsung SM-304B (**www.Samsung.com**) and the Toshiba SD-R1002 (**www.Toshiba.com**) aren't inexpensive drives because there's something wrong with them—both performed flawlessly throughout testing. Rather, their low-low-low prices reflect their old-school speed ratings of 4/4/24 for CD-RW and 4x for DVD-ROM. That's barely fast enough to get the job done. Along these same lines, the software bundle consists of just the bare necessities: *Easy CD Creator 4* and *DirectCD* for disc duplication, and Cyberlink *PowerDVD* for watching movies. Granted, 90 percent of users will never need anything beyond these three programs, so we'll keep our complaints about the bundle's skimpy nature to a dull roar.

In testing, both the Samsung and the Toshiba performed as expected, but surprised us by offering next-gen features typically found on drives that cost twice as much. Both drives support 80-minute media and packet writing, and can read CD-Rs burned at a variety of speeds. But what really shocked us were the drives' audio capabilities. Both drives are capable of audio extraction, of course, and also have the ability to report alignment errors to the software. Normally, such features are found only in CD-RW drives from Plextor and TDK. Needless to say, the sound quality of extracted files created by either drive was excellent, although the 8x and 9.5x average extraction speeds were OK at best.

As testing continued, Samsung further surprised us: Its SM-304B actually worked with *Clone CD*, which we've found to be functional with only a handful of drives. The notorious disc duplication program lets you copy any disc, bypassing the copyright programs that can, for instance, prevent the duping of games. The Toshiba drive, sadly, did not work with *Clone CD*; this shortcoming proved to be the only major difference between the two drives during testing.

Two side notes: We found that the Samsung drive supported overburning, whereas the Toshiba didn't. But since both drives support 80-minute media, the subject is moot. Also, both drives reported CPU utilization scores of 100 percent, so multitaskers may want to steer clear of these bad boys.

We expected little from these drives, but ended up thoroughly impressed. The Samsung drive is the first we've ever tested that's able to complete any CD-R or DVD task. The Toshiba is no slouch either, but since it costs a little more than the Samsung and doesn't work with *Clone CD*, we can't recommend it as wholeheartedly. If you don't care about making game backups, then picking between these drives is best done with a coin toss—they're that close in terms of performance and features.

—Josh Norem

DARE TO COMPARE

MANUFACTURER	SAMSUNG COMBO	TOSHIBA COMBO
DVD TACH		
DVD rating	4x	4x
CD-RW rating	4/4/24	4/4/24
Average read speed	2.6x	**3.1x**
CD TACH		
Average read speed	16.7x	16.7x
Max. sequential read (MB/sec)	3.72	**3.75**
Min. sequential read (MB/sec)	**1.61**	1.56
Full stroke/random access (in milliseconds)	**193**/99	288/**81**
CPU utilization (min/max)	100%	100%
Data CD Creation (min:sec)	20:25	**20:11**
Mixed mode CD duplication (min:sec)	**18:40**	19:06
Software bundle	Adaptec *DirectCD* Adaptec *Easy CD Creator* Cyberlink *Power DVD*	Adaptec *DirectCD* Adaptec *Easy CD Creator* Cyberlink *Power DVD*
Audio extraction (min:sec)	**4:05**	4:18

SAMSUNG SM-304B — **8**

$270 | Samsung
Buy www.SeeMeBuyMe.com
877.751.7467 | ID#0933

TOSHIBA SD-R1002 — **7**

$289 | Toshiba
Buy www.SeeMeBuyMe.com
877.751.7467 ID#0934

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HP Deskjet 350CBi Mobile Color

MOVERS AND SHAKERS, REJOICE!

Corporate road warriors need a powerful, portable printer that can churn out critical documents anywhere, and that's exactly what the HP Deskjet 350CBi Mobile Color Printer (**www.hp.com**) does. This wee printer comes with high-volume black and tri-color ink cartridges that are designed to withstand bumps, temperature fluctuations, and even high altitudes without leaking. The IR adapter and rechargeable battery allow printing without wires, and motion-stabilizing heads and a shock-resistant chassis help this printer survive the trials of travel.

However, the 350CBi is best at black-and-white prints, not color. It'll suffice if you need to print a *PowerPoint* pie chart, but the 350CBi's tri-color cartridges are adequate at best, yielding prints with poor color quality, spotting, and granulation. And printing in color at the highest setting will set you back about a minute and a half per page.

Luckily, the black ink produces satisfying results. This little printer can crank out approximately five pages a minute on the Draft setting; at the Best setting, speeds hit about one page per minute. Prints at the higher-quality setting suffered little of the spotting and spitting that are common problems in some of the Deskjet's bigger cousins. The printer also comes with a 30-page feeder, though it's a little twitchy and prone to paper jams.

The 350CBi makes a sweet traveling companion for jet-setting execs.

The 350CBi allows printing on transparencies, brochure paper, and labels. And the battery, which charges in about an hour and a half, is good for up to two hours of standby time.

For folks on the move, the Deskjet is an excellent investment and a perfect notebook companion.

—Geoffrey Visgilio

PLUSES
- Light, tough, and small
- Fast and quiet
- Rechargeable battery
- IR adapter

MINUSES
- Color printing is awful
- Paper feeder is twitchy

MAXIMUM PC VERDICT 8

$300 | Hewlett-Packard
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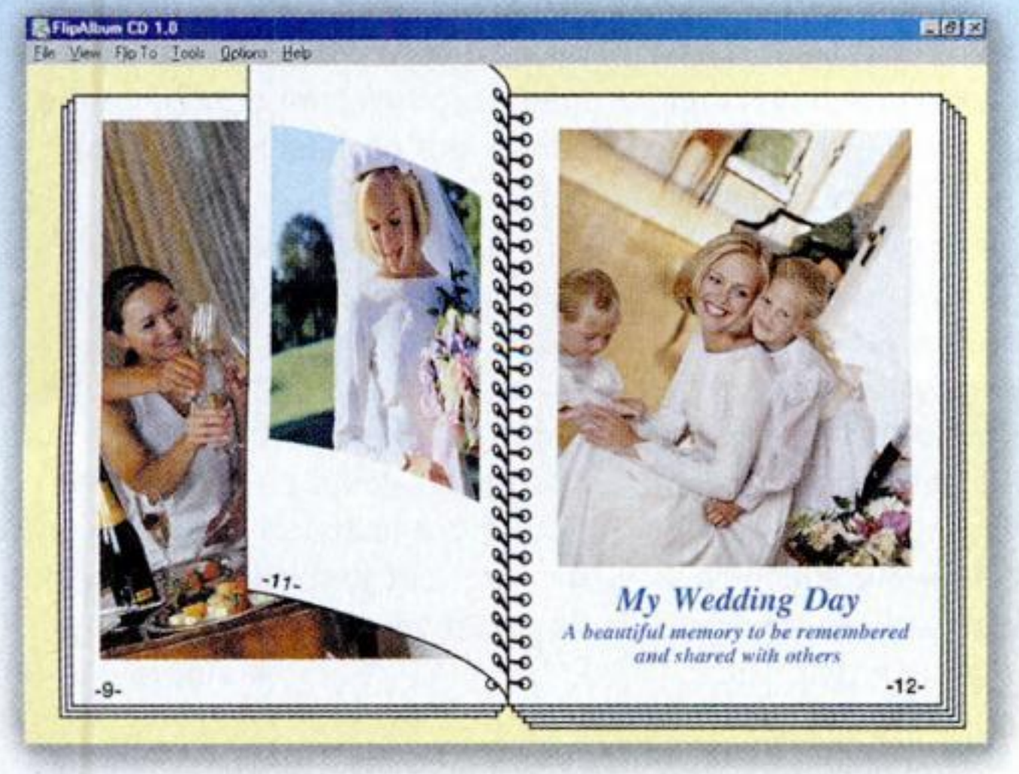
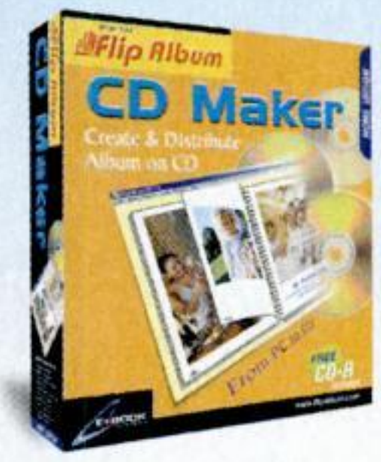
Create and Distribute Your Digital Photo Album on CD



- Create digital photo albums on a CD quickly & easily.*
- Anyone who receives the CD can simply pop it into his/her drive and view it instantly. No downloading or installing of software required.
- The pages in the FlipAlbum CD™ actually flip like real photo album.
- For non-commercial distribution, unlimited copies. Business Edition required for commercial distribution.



*requires a CD-RW drive for CD-R recording

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Diablo II

DEVILISHLY FUN, BUT A TECHNOLOGICAL THROWBACK

When it was released in 1997, the original *Diablo* turned the PC gaming world upside down. The RPG was evil and engrossing, and took point-and-click gameplay to new heights. Now, *Diablo II* (**www.blizzard.com**) has arrived, and we have just one thing to say:

We waited three years for *this*?

At first glance, *Diablo II* seems to have arrived too late to matter. The graphics are low-res, and barely take advantage of 3D acceleration—we're talking 640x480 maximum resolution here, folks. The voice acting is generally poor, and the writing could use a major polish. The story is nowhere near as compelling as the original's tight yarn; in fact, *Diablo II* seems to just lurch along from quest to quest. Indeed, you know there's a problem when the users' manual seems more interesting than the fantasy game world on your screen.

But *Diablo II*'s issues are somewhat diffused if you're willing to give it more than just a cursory glance. Dig a little deeper and you'll discover that *Diablo II* is much bigger than its predecessor—the play area is approximately three times larger, featuring architecture that ranges from medieval dungeons to Egyptian tombs. Incredibly interesting environments include the astral plane, the ruins of Tristram, and the bowels of Hell itself. And, whereas the first title offered three, somewhat vanilla classes of characters, *D2* offers five: Barbarian, Sorceress, Necromancer, Paladin, and Amazon. Each class has access to 30 different skills and spells, affording almost infinite replay value. The more than 70 monster types have variations totaling well into the hundreds and all are well animated, despite the creaky graphics engine.

***Diablo II* is here... and it's the same as the first game! Since the original was as addictive as crack, that's not so bad.**

PLUSES
- Addictive gameplay
- Three times the size of the original
- Addictive multiplayer

MINUSES
- Poor voice acting and writing
- Dated graphics
- Shallow for an RPG

THE SPECS

3D CARD SUPPORT
Direct3D | Glide

3D AUDIO SUPPORT
DirectSound 3D | EAX

MULTIPLAYER
TCP/IP | IPX | LAN
Battle.Net

NUMBER OF PLAYERS
8

***Diablo II* is approximately three times larger than the original title, and features a variety of locales, ranging from parallel dimensions to the depths of Hell.**

Diablo II's gameplay couldn't be more straightforward: Simply use your mouse to move your character around, click on creatures that you want to slay, then pick up the goodies they leave behind. That's all. In this respect, *Diablo II* is a throwback to earlier arcade games such as *Venture* or *Gauntlet*. It's simple stuff, really, but Blizzard has ensured that you gain levels and new powers frequently enough to keep things from getting dull. The waves of beasts get larger, the monsters become nastier, and the spells and weapons at your disposal get cooler and more exciting all the way up to the game's climax. And after you've finished, you can head over to Battle.Net and do it all over again online.

Battle.Net, the free online service that allows up to eight people to take on the game at the same time, is a treat—or it will be, once Blizzard figures out how to cope with the unexpected deluge of players. At press time, hordes of people were upset with Blizzard for continually taking the servers down for maintenance, and we can only hope the bandwidth problems are solved before too long.

Despite its simplicity, *Diablo II* delivers exactly what fans of the original expected. It's a shame it's so similar to the first game, but it certainly offers a lot of familiar fun. The game would have benefited from more technical advancement, for sure, but that hardly diminishes its addictive nature.

—Andrew S. Bub

MAXIMUM PC VERDICT 7

$50 | Blizzard
Buy www.SeeMeBuyMe.com
877.751.7467 ID#0936

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Deus Ex

A DELICIOUS CONSPIRACY AWAITS YOU

Silent, deadly, and efficient are the prime qualities of an augmented UNATCO agent in *Deus Ex*.

In one of the most promising titles of the year, Ion Storm has successfully woven a tale of intrigue, deception, and revolution, set in an eerily possible future where the world stands on the brink of destruction. Welcome to *Deus Ex* (**www.deusex.com**), a phenomenal game that grabs you by the throat and never lets go.

Designed by Warren Spector (of *System Shock* and *Ultima VIII* fame), *Deus Ex* blends several genres, with satisfying results. Admittedly, the "you must unravel the secrets behind a timeless conspiracy in a post-apocalyptic world" plot has been done ad nauseam in previous titles, but *Deus Ex* breaks new ground by letting you decide how the plot unfolds. Throughout the game, you're asked to choose between several possible paths. For example, if you need to enter a building, you can blast through the front door, crawl through the ventilation system, or scale the building and drop in through the ceiling. If you see an enemy guard, you choose whether to bust a cap in his ass, sneak past him through the shadows, or quietly subdue him with a taser gun or tranquilizer dart. Your chosen action ultimately affects the game's outcome, and adds nearly endless replay value to the title.

Another interesting twist is the ability to enhance the main character's special skills, such as sniping or computer hacking, as well as his genetically enhanced parts, called nano-technology mods. These improvements come in the form of augmentation canisters available at strategic points throughout the game. You're always offered two canisters, but can choose only one—from then on, you'll possess the chosen power, but always be denied the power contained in the canister you passed up.

Contributing greatly to *Deus Ex*'s sheer intensity is the clever AI programming that controls electronic devices, such as security robots, gun turrets, and alarm systems, as well as human characters that include friendly and hostile NPCs. NPCs aren't of the typical, "there's a dead guy on the ground, ho-hum," variety; rather, they're shrewd enemies who react to noise, movement, and light. Friendly NPCs also work well, responding logically to your questions and comments. In some cases, the robotic AI is so efficient it can be frustrating. Still, some of the most exciting points of the game are when you're trying to foil the ever-present alarm systems and evade the prying eyes of the security cameras.

While we have nothing but praise for the attention to detail in *Deus Ex*, 'tis a shame it's based on the aging *Unreal* engine, which is optimized for the now-dead Glide API. Not surprisingly, the Direct3D code is awful. Even on a 1GHz box with a GeForce 2 card, we saw dropped frames, though the condition improved when we switched to a Voodoo 5 card and ran Glide. The game was playable in Direct3D with the texture detail turned down, but with a 1GHz/GeForce 2 system, we shouldn't have to do that.

Overall, *Deus Ex* is a lush game with a fantastic storyline in the spirit of *Akira* and *Neuromancer*, where multiple paths and choices add an air of conscious interaction to the experience, and the looming question of whom to trust and what's really going on keeps you on your toes. Take it from us conspiracy buffs: Trust no one, but buy this game.

—Geoffrey Visgilio

PLUSES
- Non-linear, epic, and engrossing storyline
- Robot enhancements are cool
- NPCs play an important role

MINUSES
- Runs choppy in Direct3D

THE SPECS

3D CARD SUPPORT
Direct3D/Glide

3D SOUND SUPPORT
Direct Sound | EAX | A3D

MUTIPLAYER
None

Interactions with NPCs are much more involved than in other games, and directly affect the outcome of the game.

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MDK2

WACKY SEQUEL HAS NO EQUAL

It's not often that a sequel surpasses its original in terms of innovation, excitement, and panache. But just as *Unreal Tournament* was far superior to its predecessor, so it is with *MDK2* (**www.interplay.com**), a third-person, action-adventure romp.

Developed by BioWare—the studs responsible for *Baldur's Gate*—*MDK2* rekindles the magic of *MDK* and creates plenty more, particularly by allowing you to play as any of the game's three characters, rather than just one. This added dimension increases variety, while still maintaining the original game's irreverent sense of humor, penchant for daunting puzzles, and fast action.

In the original, you played solely from the perspective of Kurt Hectic, a reluctant hero employed as a janitor by Dr. Fluke Hawkins. In *MDK2*, you play more than half the game as Max, the Doctor's six-legged sidekick hound, or as Dr. Hawkins himself. Each character possesses a distinctly different style, and you can't choose which character to play until the final level.

MDK2's designers took advantage of Max's extra limbs, letting you lock-and-load up to four weapons at once. In other words, this dog will hunt—literally. The Doc, on the other hand, lacks physical prowess, but his inventive intellect means you can create tools and weaponry from items he discovers. The Doctor's levels are the most puzzle-intensive, and their size and time requirements can be a bit frustrating. However, using the wacky inventions he creates proves most satisfying; we particularly enjoyed creating a leafblower from a hand dryer, some pipes, and duct tape, then using it to blow a bunch of aliens into the waiting jaws of a gigantic Venus Fly Trap.

Graphically, *MDK2* is beautiful. The Omen engine delivers stunning, expansive 3D environments (10 in all), and includes support for hardware transform and lighting. BioWare says that with T&L enabled, frame rates should jump 10 to 20 percent, letting you take the game to a higher resolution without any slowdown. Based on our experience, and the comments of other gamers on the *MDK2* forum, nVidia's GeForce is the chipset to have if you're playing *MDK2*—sorry, Voodoo fanatics.

Interestingly, the engine is so "next-gen" that we experienced several frame rate issues. In one particular section of the game, action slowed to about 5fps on our 1GHz P-III test system. According to BioWare's *MDK2* FAQ, that section uses over 80MB of texture data in a single scene—no wonder we had problems! Don't let the engine's brawn frighten you, however, since 99 percent of the game is very playable on even more modest systems. Our Athlon 700/GeForce 2 ran the game silky-smooth except for that one scene, and controls are available to tone down the texture detail if your system can't handle it. Our only complaint about the graphics is that there's no way to turn up the game's brightness, and some of the levels are so dark that we had trouble finding our way around.

Our only other complaint with *MDK2* is that it ends too quickly—actually, it's fun from start to finish. Not since *Half-Life* have we enjoyed an action/shooter game this much.

—Joel Strauch

In *MDK2*, you play as a scientist, a janitor with a sniper rifle, or as Max, the six-legged robotic dog pictured above. Yes, it's weird, but it's very, very fun.

PLUSES
- Beautiful 3D engine
- Can play as all three characters
- Damned funny

MINUSES
- No multiplayer
- A tad dark
- Puzzles can be frustrating

THE SPECS

3D CARD SUPPORT
Open GL

3D SOUND SUPPORT
DirectSound I EAX

MULTIPLAYER
None

As Dr. Hawkins, you must use brains rather than brawn to advance. Above, an alien brain has activated a bomb, and we have 1:27 minutes to figure out how to disarm it.

MAXIMUM PC VERDICT 9

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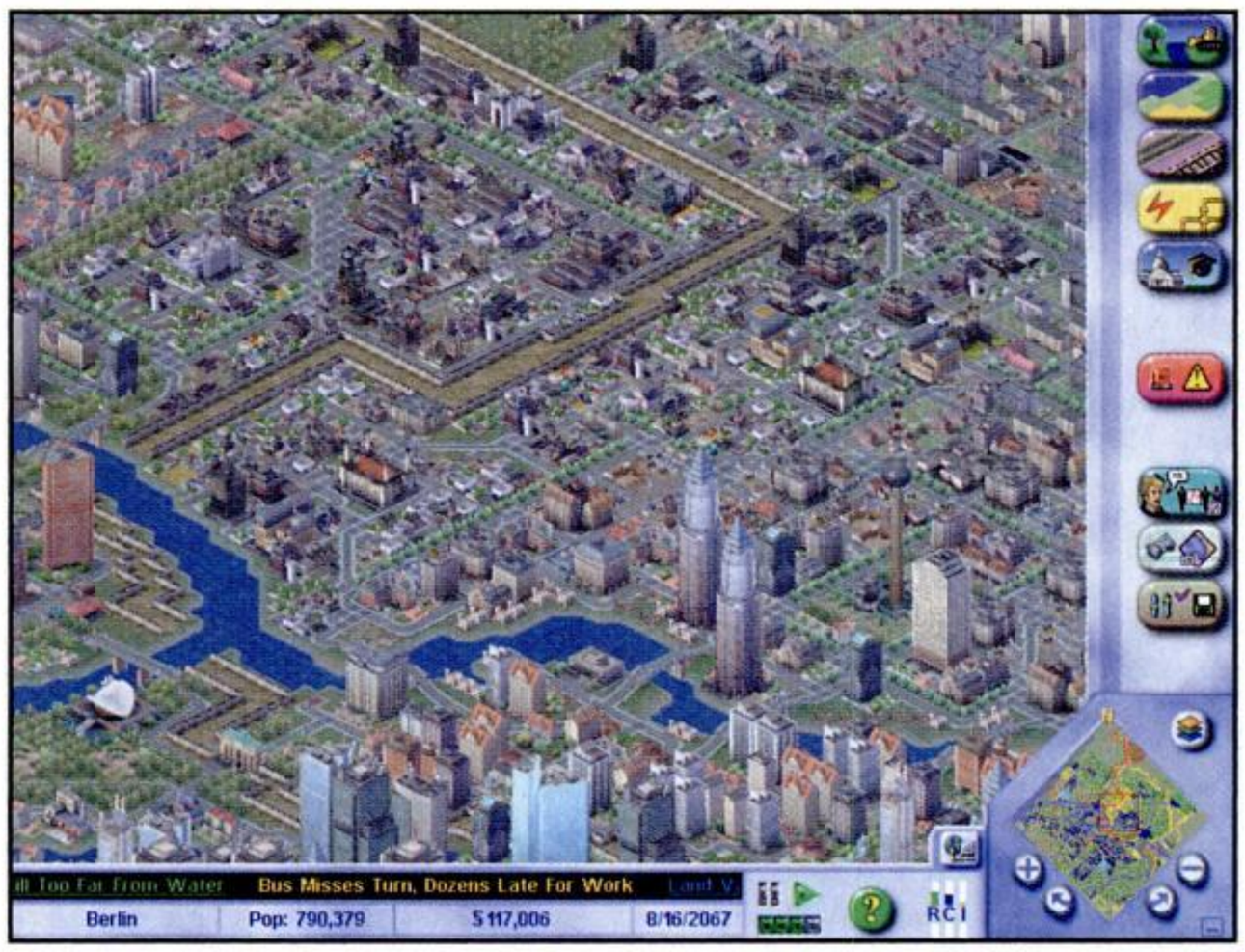
SimCity 3000 Unlimited

SIM GETS A SPIT-SHINE

Don't be fooled by the shiny new box and expanded title—*SimCity 3000 Unlimited* (**www.simcity.com**) is not a new edition of *SimCity*. Rather, it's a beefed-up version of the original game, with a host of welcome new features and expanded gameplay. However, most of this value-added material will primarily be of interest to hardcore city managers.

One of the most impressive new tools included with *SC3K* is the building architect, a marvelous piece of stand-alone software that lets you build a structure from scratch using shaped blocks. You can then enhance and decorate your raw structure with colors, textures, architectural features, and doodads that range from domes and antennas to pink flamingos and swimming pools. Buildings can be modified or created from scratch, then added to the game or uploaded to the building depot at **www.simcity.com**.

The scenario creator is another new twist in *SC3K*. Thirteen scenarios are shipped with the game, and more are already popping up online. Each scenario is comprised of a pre-made city and a specific task, such as preparing for the Olympics, reuniting East and West Germany, stamping out crime, or fending off various disasters. Most have time requirements and don't allow for pausing, making the scenarios extra challenging. Supposedly, a separate scripting engine allows you to create these parameters from scratch, but runtime conflicts and bugs in the shipped version prevented us from doing so. We're told that a fix is in the works.



New to *SC3K* are "scenarios" that require you to accomplish a task, such as reuniting East and West Berlin, in an allotted time period.

The rest of the *SC3K* box is filled with just about what you'd expect, and all of it's done well. Four new disasters join the three found in the original title, allowing you to unleash locusts, burning space junk, poisonous clouds, or a giant harbor-swallowing whirlpool upon your hapless simfolk. New landscape selections are also included, so you can craft environments that are barren, covered in snow, or desert-like. The landscapes aren't particularly convincing and don't affect gameplay, but hey—A for effort, guys.

To really alter the look of a city, you can employ *SC3K's* new building-style sets. The Asian set features little pagodas and Tokyo-style high-rises, while the European set contains slightly Germanic-looking structures. All told, the building count has gone from a meager 498 to a whopping 839, including 23 new landmarks that are impressive in scope. Sadly, you won't find a giant Buddha or a Reichstag among them.

Everything else about *SC3K* remains the same as the original, but because it's a classic design with a stylish look and 3D-accelerated graphics, the game has aged well. You lay down residential, commercial, and industrial zones of varying density; set up some basic infrastructure; monkey with the budget; and attempt to build a city that's at least better than Pittsburgh. Such a fundamentally perfect design would be hard to ruin; in fact, this latest version does it full justice. *SimCity 3000 Unlimited* may be an enhanced edition of a two-year-old game, but it plays as well now as it ever did.

—T. Liam McDonald

PLUSES
- New scenarios, and a scenario editor
- Building architect
- Lots of new buildings

MINUSES
- If you've played the original, you won't get $40 worth

THE SPECS

3D CARD SUPPORT
Direct3D

3D AUDIO SUPPORT
DirectSound

MULTIPLAYER
None

Women and children first! The latest *SimCity* includes tons of new content, including several perilous disasters such as this toxic cloud.

MAXIMUM PC VERDICT 8

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StarLancer

WING COMMANDER REDUX

Eagerly anticipated *StarLancer* (**www.digitalanvil.com**) is the first space-combat simulation released by brothers Chris and Erin Roberts since they founded Digital Anvil studio. The brothers Roberts essentially pioneered the space-combat genre with the seminal *Wing Commander* titles, paving the way for the classic *Star Wars* titles and Volition's gorgeous *Freespace 2*, among others. With *StarLancer*, many hoped the Roberts would boldly go where no studio has gone before. Sadly, it seems they've chosen to stick to safer, more familiar ports.

***StarLancer* attempts to reheat the Cold War in outer space, but gets only lukewarm.**

PLUSES
- Competent graphics and effects
- Cold War storyline is fun
- Tried and true interface and controls

MINUSES
- Story goes nowhere
- Bland characters
- Tired and uninspired compared to other games in the genre

THE SPECS

3D CARD SUPPORT
OpenGL | Direct3D

3D SOUND SUPPORT
EAX | A3D DirectSound 3D

CONTROLLER INPUT
Joystick | Force feedback support

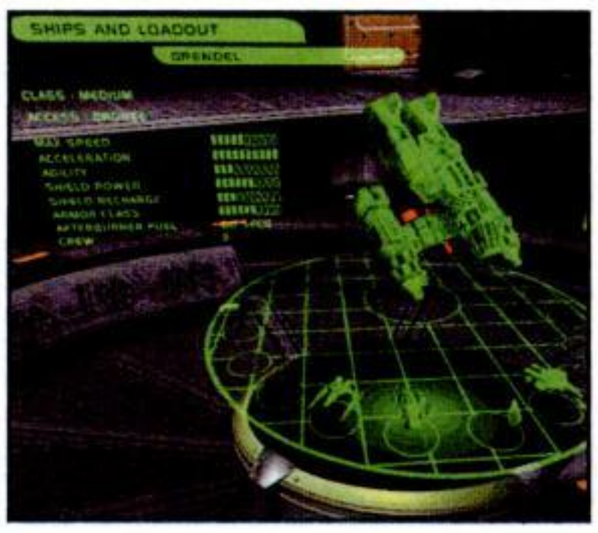
MULTIPLAYER
TCP/IP | LAN | MS Gaming Zone

NUMBER OF PLAYERS
16 via TCP/IP | 4 in co-op

StarLancer is a cliché-ridden retread of earlier, often better space shooters. It compares unfavorably with its contemporaries, including the gorgeous and majestic *Freespace 2* and the quick-as-lightning *X-Wing Alliance*. *StarLancer* just doesn't immerse you in the story the way those other titles do.

The action takes place in our solar system, sometime in the near future. The Soviets are cast as the enemies, engaging players in a familiar battle and giving the game a retro feel. But the story doesn't progress much beyond this premise. Instead of focusing on a developing war, missions are of the standard escort, seek-and-destroy, and hunt variety. *StarLancer* doesn't offer much by way of character development, and provides precious little story satisfaction to boot.

Missions average 20 minutes in length, and the lack of a Save option leads to dull repetition. The supporting cast of Wingmen play a much less compelling role in *StarLancer* than does the beloved cast in *Wing Commander* (beloved outside the film, that is), and the engrossing soap-opera subplot of *WC* is completely missing here. It's sad, because *StarLancer* could really benefit from more complex narratives.



Graphics are well done, with impressive weaponry and effects. Here, we load up our Grendel prior to a mission.

The original *Wing Commander* pushed the technology envelope, but *StarLancer* doesn't continue that tradition. Although its technology is on par with current titles, nothing about this game is revolutionary. Still, *StarLancer* at least looks and sounds good. Ambient lighting illuminates starship textures as your lasers hit home, and the explosions feature particle and smoke effects that help to bring the space combat to life in a way that the storyline cannot. 3D sound, using Creative's EAX extensions or DirectSound 3D, brings you into the center of the fight. And, to its credit, *StarLancer* doesn't require a Dream Machine to achieve playable frame rates. On our modest 450MHz test system equipped with a GeForce 256 videocard, *StarLancer* was perfectly playable with nary a hiccup, even set to maximum detail at 1024x768 resolution.

Multiplayer mode proves to be *StarLancer's* saving grace; it offers a slew of options ranging from standard deathmatch to co-op missions (up to four can play the campaign). Hunt the Shadow mode, in which one player can cloak and fire but lacks shields, and Vampire mode, in which one player is considered "infected" in a sort of reverse tag game, are among the unusual deathmatch scenarios that add spice to the multiplayer experience. The Microsoft Gaming Zone is already buzzing with activity, proving that *StarLancer* has multiplayer legs.

Unfortunately, the single-player campaign suffers because it lacks advances generally found in the genre. Perhaps the long-delayed *FreeLancer* sequel will address some of these issues and more fully flesh out the compelling yet underused "interstellar Cold War turned hot" storyline. Until then, it's hard to get excited about *StarLancer*.

—Andrew S. Bub

MAXIMUM PC VERDICT **6**

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Vampire: The Masquerade

BLOODY GOOD GAMING

Once *Vampire: The Masquerade—Redemption* (**www.activision.com**) sinks its teeth into you, you'll be under its spell. That says a lot for the RPG's design, because *Vampire* has several glaring technical problems and a less than accommodating Save Game that seems to come straight from console-land. The fact is that many elements of *Vampire* are so strong, they can carry you through the rough spots.

Vampire has its roots in a long-running pen-and-paper role-playing game developed by White Wolf. It's provided the developers at Nihilistic with a broad canvas on which to paint their third-person action/RPG. The world of *Vampire* is one of brooding atmosphere, and of epic, globe- and time-spanning wars among vampire clans. The story is quite deep, though it boils down to you as a vampire searching for your true love, and battling vampire clans along the way.

The engine that drives *Vampire* is simply spectacular—when it works. Textures are highly detailed and frame rates are fluid throughout. Multiple option settings allow more detailed tweaking of the visual performance than we're accustomed to, and these variables may contribute to the game's occasional visual glitches. Until you hit on precisely the right settings—and sometimes even after that—you may experience weird lighting pop-in and texture blinking. Some of this is card-specific, with GeForce and ATI taking most of the hits.

Control is clean as a whistle, with functions placed neatly on the mouse or on the screen. And the game's third-person perspective works well, providing a smoothly scrolling adjustable view that's a plus, though somewhat offset by pathfinding and collision detection bugs. These bugs are manageable, but they mar an otherwise excellent package, and Nihilistic is supposedly working to fix them. The company is also working to implement a better Save Game scheme, since, as it stands, you can save only between levels or when the character visits his lair.

In *Daikatana*, the game did the sucking. In *Vampire: The Masquerade—Redemption*, you do the sucking.

Vampire is essentially a party-based combat game with strong RPG overtones. Stats are central to the development of characters' fighting strengths and vampire "disciplines," sets of special powers that can be acquired through experience and used to heal, attack, protect, and shape-shift. The primary vampire power is, of course, bloodsucking, which enables a character to drain the blood from a target and increase his own magic and healing abilities. Combat is thus a satisfying mix of various weapon attacks mixed with discipline casting, all done on the fly and fairly intuitively. You have control of only one party member at a time, while the rest fight via AI.

Rounding out the package is a strong multiplayer mode. "Storytelling," as it's called, allows one person to create an adventure and modify it on the fly; up to four others are also able to play. As online players move through an adventure, the storyteller can add, move, or remove monsters, items, or the players themselves.

Vampire's strengths are the result of a strong design, and its weaknesses are largely due to the technology's occasional inability to meet the demands of its rich content. Still, gifted with a complex storyline, finely crafted dialogue, and nicely layered combat experience, *Vampire* is one of the more interesting games of the season.

—T. Liam McDonald

PLUSES
- Deep gameplay with plenty of levels and stats
- Good story and scripting
- Atmospheric environments

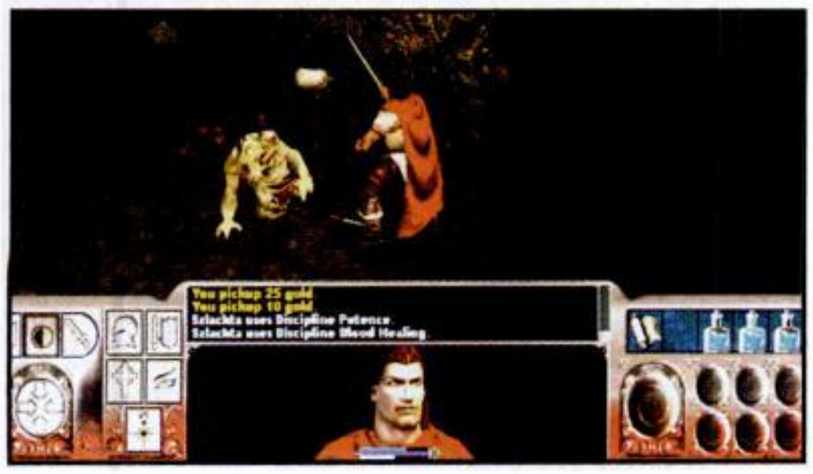
MINUSES
- Pathfinding and collision detection bugs
- Graphical glitches
- Weak Save Game feature

THE SPECS

3D CARD SUPPORT
Direct3D

3D AUDIO SUPPORT
DirectSound

MULTIPLAYER
LAN (1 to 4 players)
TCP/IP



The gore quotient is pretty restrained considering the subject matter, but you'll still find some splattery deaths and amusing decapitations.

MAXIMUM PC VERDICT 8

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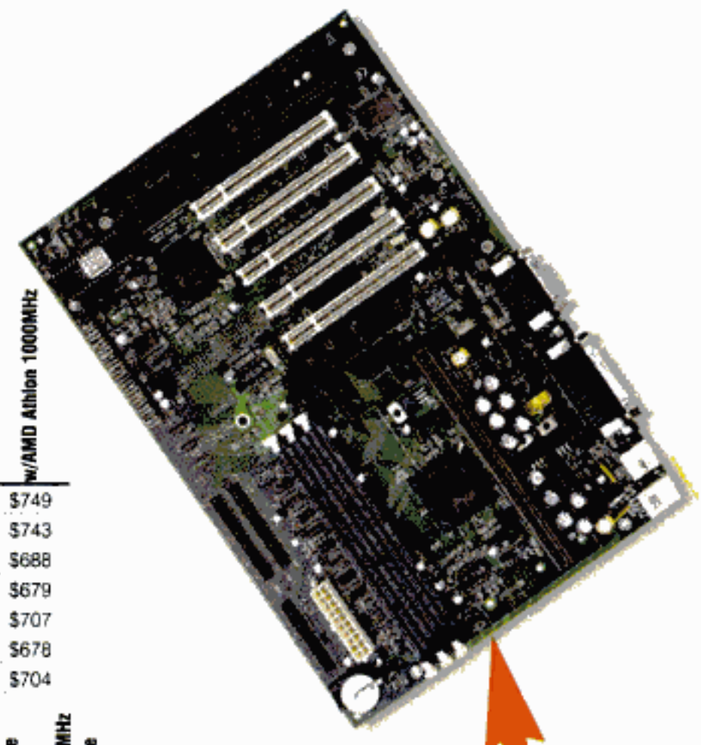

Slot A

	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Bus Frequency	Integrated Controller	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/AMD Athlon™ 700MHz	w/AMD Athlon 750MHz	w/AMD Athlon 800MHz	w/AMD Athlon 850MHz	w/AMD Athlon 900MHz	w/AMD Athlon 950MHz	w/AMD Athlon 1000MHz
ABIT KA7-100	MB7502	VIA Apollo KX133	2048	4	Award	200/133	UltraDMA/100	6	1	1	ATX	1 Yr.	$179	$354	$374	$399	$464	$504	$604	$749
Asus K7V	MB7703	VIA Apollo KX133	1536	3	Award	200/133	UltraDMA/66	5		1	ATX	1 Yr.	$173	$348	$368	$393	$458	$498	$598	$743
EPoX EP-7KXA	MB7850	VIA Apollo KX133	768	3	Award	200/133	UltraDMA/66	5	1	1	ATX	2 Yrs.	$118	$293	$313	$338	$403	$443	$543	$688
FIC SD11	MB7401	AMD-751 / VIA 686A	768	3	Award	100	UltraDMA/66	5	1	1	ATX	1 Yr	$109	$284	$304	$329	$394	$434	$534	$679
Microstar K7 Pro	MB7202	AMD-750	768	3	Award	100	UltraDMA/66	6	1	1	ATX	1 Yr	$137	$312	$332	$357	$422	$462	$562	$707
Shuttle AI61	MB7901	AMD-750	768	3	Award	100	UltraDMA/66	5		1	MicroATX	1 Yr	$108	$283	$303	$328	$393	$433	$533	$678
Tyan S2380 Trinity K7	MB7000	VIA Apollo KX133	768	3	Award	200/133	UltraDMA/66	6	1	1	ATX	3 Yrs.	$134	$309	$329	$354	$419	$459	$559	$704

Socket A

	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Bus Frequency	Integrated Controller	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/AMD Duron™ 600MHz	w/AMD Duron 650MHz	w/AMD Duron 700MHz	w/AMD Athlon™ 700MHz with Enhanced Cache	w/AMD Athlon 800MHz with Enhanced Cache	w/AMD Athlon 850MHz with Enhanced Cache	w/AMD Athlon 900MHz with Enhanced Cache	w/AMD Athlon 950MHz with Enhanced Cache	w/AMD Athlon 1000MHz with Enhanced Cache
ASUS A7V	MB7704	VIA Apollo KT133	1536	3	Award	200/133	UltraDMA/100	5		1	ATX	1 Yr.	$189	$272	$289	$319	$364	$409	$474	$514	$614	$759
EPoX EP-8KTA	MB7851	VIA Apollo KT133	768	3	Award	200/133	UltraDMA/66	6	1	1	ATX	2 Yr.	$139	$222	$239	$269	$314	$359	$424	$464	$564	$709
FIC AZ11	MB7402	VIA Apollo KT133	1536	3	Award	200/133	UltraDMA/66	5		1	ATX	1 Yr.	$139	$222	$239	$269	$314	$359	$424	$464	$564	$709
Microstar K7T Pro	MB7203	VIA Apollo KT133	1536	3	Award	200/133	UltraDMA/66	5		1	ATX	1 Yr.	$159	$242	$259	$289	$334	$379	$444	$484	$584	$729

Slot 1

	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	168-pin RIMM Sockets	Flash BIOS	Integrawed Audio	Integrawed Controller	PCI Slots	ISA Slots	AGP Slot	Formaw	Manufacturer's Warranty	Motherboard Only	w/Intel® Pentium III® 600/B 512K 100/133MHz FSB	w/Intel Pentium III 700 256K OD 100MHz FSB	w/Intel Pentium III 733 256K OD 133MHz FSB	w/Intel Pentium III 750 256K OD 100MHz FSB	w/Intel Pentium III 800/EB 256K OD 100/133MHz FSB	w/Intel Pentium III 850 256K OD 100MHz FSB	w/Intel Pentium III 933 256K OD 133MHz FSB	w/Intel Pentium III 1000 256K OD 133MHz FSB	w/Dual Intel Pentium III 600 512K 100MHz FSB	w/Dual Intel Pentium III 850 256K OD 100MHz FSB
ABIT BE6-II	MB6508	Intel 440BX	768	3		Award		UltraDMA/66	5	1	1	ATX	1 Yr	$138	$338	$373	N/A	$428	$443	N/A	N/A	N/A	N/A	N/A
ABIT VA6	MB6509	VIA Apollo Pro 133	768	3		Award	AC-97	UltraDMA/66	5	2	1	ATX	1 Yr	$84	$284	$319	$319	$374	$389	$504	$694	$904	N/A	N/A
ABIT VT6X4	MB6510	VIA Apollo Pro 133A	768	3		Award	AC-97	UltraDMA/66	5	2	1	ATX	1 Yr.	$105	$305	$340	$340	$395	$410	$525	$715	$925	N/A	N/A
ASUS P2B-DS (Dual)	MB6707	Intel 440BX	1024	4		Award			4	2	1	ATX	1 Yr	$494	$694	$729	N/A	$784	$799	N/A	N/A	N/A	$894	$1334
ASUS P3B-F	MB6720	Intel 440BX	1024	4		Award			6	1	1	ATX	1 Yr	$138	$338	$373	N/A	$428	$443	N/A	N/A	N/A	N/A	N/A
ASUS P3V4X	MB6723	VIA Apollo Pro 133A	1024	4		Award		UltraDMA/66	6	1	1	ATX	1 Yr.	$121	$321	$356	$356	$411	$426	$541	$731	$941	N/A	N/A
EPoX EP-6VBA2	MB6855	VIA Apollo Pro 133A	768	3		Award	AC-97	UltraDMA/66	4	2	1	ATX	2 Yrs.	$108	$308	$343	$343	$398	$413	$528	$718	$928	N/A	N/A
Intel L440GX+ (Dual)	MB6917	Intel 440GX	2048	4		Intel/Phoenix		Adaptec 2-Ch U2W	6	1		ATX	3 Yrs.	$549	$749	$784	N/A	$839	$854	N/A	N/A	N/A	$949	$1389
Intel SE440BX-2 "Seattle"	MB6921	Intel 440BX	768	3		Intel/Phoenix			4	2	1	ATX	3 Yrs	$117	$317	$352	N/A	$407	$422	N/A	N/A	N/A	N/A	N/A
Shuttle AV64	MB6309	VIA Apollo Pro 133A	768	3		Award		UltraDMA/66	5	2	1	ATX	1 Yr	$93	$293	$328	$328	$383	$398	$513	$703	$913	N/A	N/A
SuperMicro P6DGU (Dual)	MB6122	Intel 440GX	2048	4		AMI		Adaptec U2W	5	2	1	ATX	1 Yr.	$474	$674	$709	N/A	$764	$779	N/A	N/A	N/A	$874	$1314
SuperMicro P6SBA	MB6120	Intel 440BX	768	3		AMI			4	3	1	ATX	1 Yr.	$99	$299	$334	N/A	$389	$404	N/A	N/A	N/A	N/A	N/A
SuperMicro P6SBU	MB6128	Intel 440BX	1024	4		AMI		Adaptec U2W	4	3	1	ATX	1 Yr	$335	$535	$570	N/A	$625	$640	N/A	N/A	N/A	N/A	N/A
Tyan S1834 Tiger 133 (Dual)	MB6020	VIA Apollo Pro 133A	2048	4		Award		UltraDMA/66	6	1	1	ATX	3 Yrs.	$169	$369	$404	$404	$459	$474	$589	$779	$989	$569	$1009
Tyan S1854 Trinity 400	MB6018	VIA Apollo Pro 133A	768	3		Award		UltraDMA/66	6	1	1	ATX	3 Yrs	$106	$306	$341	$341	$396	$411	$526	$716	$926	N/A	N/A

Socket 370

	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Integrated Audio	Integrated Video	PCI Slots	ISA Slots	AGP Slot	AMR or CNR Slot	Format	Manufacturer's Warranty	Motherboard Only	w/Intel® Celeron™ processor 566 MHz 128K OD 66MHz FSB	w/Intel Celeron 633 128K OD 66MHz FSB	w/Intel Celeron 667 128K OD 66MHz FSB	w/Intel Celeron 700 128K OD 66MHz FSB	w/Intel Celeron 733 128K OD 66MHz FSB	w/Intel Pentium III 733 256K OD 133MHz FSB	w/Intel Pentium III 850 800/EB 256K OD 100/133MHz FSB	w/Intel Pentium III 850 256K OD 100MHz FSB	w/Intel Pentium III 866 256K OD 133MHz FSB	w/Intel Pentium III 933 256K OD 133MHz FSB	w/Intel Pentium III 1000 256K OD 133MHz FSB
ABIT SE6	MB6512	Intel 815E	768	3	Award	Intel 815E	Intel 815E	6		1	1	ATX	1 Yr.	$178	$265	$293	$316	$347	$385	$413	$483	$598	$613	$788	$998
ABIT VH6	MB6511	VIA Apollo Pro 133A	768	3	Award	AC-97		5	1	1	1	ATX	1 Yr	$109	$196	$224	$247	$278	$316	$344	$414	$529	$544	$719	$929
ASUS CUBX	MB6726	Intel 440BX	1024	4	Award	AC-97		6	1	1		ATX	1 Yr	$145	$232	$260	$283	$314	$352	N/A	$450	$565	N/A	N/A	N/A
ASUS CUSL2	MB6727	Intel 815E	1536	3	Award	Intel 815E	Intel 815E	5	1	1	1	ATX	1 Yr	$189	$276	$304	$327	$358	$396	$424	$494	$609	$624	$799	$1009
ASUS CUV4X	MB6725	VIA Apollo Pro 133A	1536	3	Award	AC-97		5	1	1	1	ATX	1 Yr	$125	$212	$240	$263	$294	$332	$360	$430	$545	$560	$735	$945
EPoX EP-3VCA	MB6854	VIA Apollo Pro 133A	768	3	Award	AC-97		4	1	1	1	ATX	2 Yrs.	$103	$190	$218	$241	$272	$310	$338	$408	$523	$538	$713	$923
FIC FA11	MB6412	VIA Apollo Pro 133A	1024	4	Award			5	2	1		ATX	1 Yr	$103	$190	$218	$241	$272	$310	$338	$408	$523	$538	$713	$923
Intel D815EEA "Easton"	MB6922	Intel 815E	512	3	Award	Intel 815E	Intel 815E	5		1	1	ATX	3 Yrs.	$175	$262	$290	$313	$344	$382	$410	$480	$595	$610	$785	$995
Shuttle AV14	MB6311	VIA Apollo Pro 133A	768	3	Award			5	2	1		ATX	1 Yr	$97	$184	$212	$235	$266	$304	$332	$402	$517	$532	$707	$917
Shuttle ME64	MB6310	Intel 810E	512	2	Award	Intel 810E	Intel 810E	3			1	Micro ATX	1 Yr.	$114	$201	$229	$252	$283	$321	$349	$419	$534	$549	$724	$934
SuperMicro 370SEA	MB6140	Intel 810E	512	2	AMI	Intel 810E	Intel 810E	6	1		1	ATX	1 Yr	$138	$225	$253	$276	$307	$345	$373	$443	$558	$573	$748	$958
SuperMicro 370DLE (Dual)	MB6154	ServerWorks LE	2048	2	AMI			6	1			ATX	1 Yr.	$333	$420	$448	$471	$502	$540	$568	$638	$753	$768	$943	$1153
SuperMicro 370DL3 (Dual)	MB6155	ServerWorks LE	2048	2	AMI			6	1			ATX	1 Yr.	$529	$616	$644	$667	$698	$736	$764	$834	$949	$964	$1139	$1349
Tyan S1854 Trinity 400	MB6018	VIA Apollo Pro 133A	768	3	Award			6	1	1		ATX	3 Yrs.	$105	$192	$220	$243	$274	$312	$340	$410	$525	$540	$715	$925

Slot 2

	Part Number	Chip Set	Maximum Memory (MB)	168-pin DIMM Sockets	Flash BIOS	Integrated Audio	Integrated Video	Integrated Controller	Integrated Networking	PCI Slots	ISA Slots	AGP Slot	Format	Manufacturer's Warranty	Motherboard Only	w/Intel® Pentium III® Xeon™ 550MHz 512K 100MHz FSB	w/Intel Xeon 550MHz 1M 100MHz FSB	w/Intel Xeon 550MHz 2M 100MHz FSB	w/Dual Intel Xeon 550MHz 512K 100MHz	w/Quad Intel Xeon 550MHz 512K 100MHz	w/Intel Xeon 700MHz 1M 100MHz FSB	w/Intel Xeon 700MHz 2M 100MHz FSB	w/Dual Intel Xeon 700MHz 1M 100MHz	w/Quad Intel Xeon 700MHz 1M 100MHz
SuperMicro S2DL3	MB6156	ServerWorks LE	4096	4	AMI			Adaptec Ultra160	Intel 82552	6	1		ATX	1 Yr.	$676	$1776	$3006	$5016	$2876	N/A	$2076	$3026	$3476	N/A
SuperMicro S2QR6	MB6190	ServerWorks HE	16384	16	AMI			Adaptec 2-Ch Ultra160	Intel 82559	8			SWTX	1 Yr.	$2732	$3832	$5062	$7072	$4932	$7132	$4132	$5082	$5532	$8332

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Hard Drive Logicube Duplication and Diagnostic Systems

Ideal for VAR & system integrators, MIS/IT departments, on-site service personnel, forensic investigative applications

- Clone over 1000 MB/minute
- Clone from 1 to 15 drives at once
- Master & target drives can be of different size, brand and model
- Master drive can hold up to 24 partitions
- Selective partitions: select one, some or all
- Bi-directional data transfer for forensic applications
- Comprehensive data recovery and drive wipe to DoD specs

1 Source → 2 Targets

OMNICLONE REPLIQUE 2

The OmniClone Replique 2 is the most portable way to copy to two native target drives.

- Dual target, IDE hard drive to hard drive duplication
- Compact—Smallest unit on the market
- Data transfer speeds exceed 800 MB/min
- Durable design—Metal case and heavy-duty removable hinge
- Any operating system—Scales FAT16, FAT32, and NTFS
- Comprehensive diagnostics features—data recovery, drive wipe, and scanning
- Removable lid for easy use
- Easily upgraded to Replique 5 with the Replique 2 Expansion Station (Targets 3,4 & 5) (*HDP502*) for $1795.00

$1,995
HDP501

1 Source → 5 Targets

OMNICLONE REPLIQUE 5

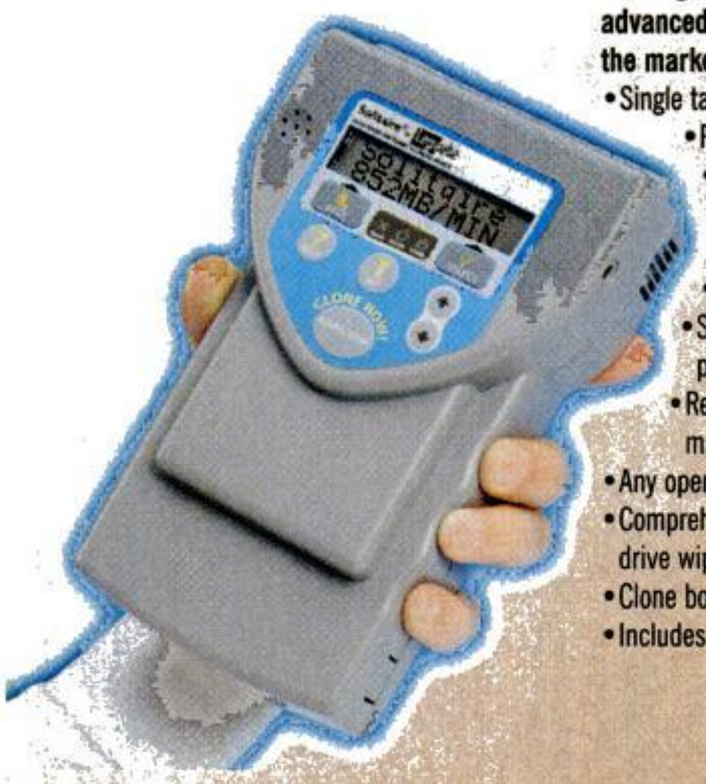
The Replique 5 package is a complete one-to-five solution, just plug it in and clone!

- Five target, IDE hard drive to hard drive duplication
- Compact—Smallest unit on the market
- Data transfer speeds exceed 800 MB/min
- Durable design—Metal case and heavy-duty removable hinge
- Any operating system—Scales FAT16, FAT32, and NTFS
- Comprehensive diagnostics features—data recovery, drive wipe, and scanning
- Modular—If one unit fails, you still have a 1 to 2

$3,650
HDP503

1 Source → 1 Target

OMNICLONE SOLITAIRE



The Logicube OmniClone Solitaire is one of the most advanced one-to-one drive duplication solution on the market today.

- Single target, IDE hard drive to hard drive duplication
- Portable—Smallest unit on the market
- Data transfer speeds exceed 1000 MB/min
- Master & target drives can be of different size, brand and model
- Master can hold up to 24 partitions
- Selective partitions - Choose one or more partitions to copy
- Reverse data transfer - clone from target to master
- Any operating system—Scales FAT16, FAT32, and NTFS
- Comprehensive diagnostics features - data recovery, drive wipe, and scanning
- Clone both ways thru a parallel port connection
- Includes carrying case, tools, cables, manual

$845
HDP500

3 Sources → 15 Targets

OMNICLONE REPLIQUE 15

OmniClone Replique 15 clones up to 15 drives at once. The units can be detached and reassigned to fit workload needs. Comes with space saving docking station with sliding ball-bearing shelves.

- Fifteen target, three master, IDE hard drive to hard drive duplication
- Compact—Smallest unit on the market
- Data transfer speeds exceed 800 MB/min
- Durable design - Metal case and heavy-duty, ball bearing slides
- Any operating system—Scales FAT16, FAT32, and NTFS
- Comprehensive diagnostics features—data recovery, drive wipe, and scanning
- Modular—If one unit fails, you only lose two targets

$9,595
HDP505

OMNICLONE SOLITAIRE

Solitaire *HDP500*	$845.00
Solitaire OmniDiagnose *HDP506*	$99.00
Solitaire Extended Warranty (2 Years Total) *HDP531*	$195.00

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OmniClone Adapter Kit 2.5" (3 Pieces) *HDP523*	$99.95
OmniClone Adapter Kit 2.5" (6 Pieces) *HDP524*	$179.95
OmniClone IDE/Power Cables 30" (1 Set) *HDP540*	$39.95
OmniClone IDE/Power Cables 30" (5 Sets) *HDP530*	$159.95

OMNICLONE REPLIQUE 2

Replique 2 *HDP501*	$1995.00
Replique 2 Expansion Station (Targets 3,4 & 5) *HDP502*	$1795.00
Replique 2 Selective Partition *HDP507*	$249.00
Replique 2 NTFS Clever Copy *HDP509*	$249.00
Replique 2 OmniDiagnose *HDP510*	$249.00
Replique 2 MasterManager *HDP541*	$249.00
Replique 2 Clone Pack (includes all options and carrying case) *HDP511*	$795.00
Replique 2 Extended Warranty (2 Years Total) *HDP532*	$495.00
Replique 2 Case *HDP535*	$99.95

OMNICLONE REPLIQUE 5

Replique 5 *HDP503*	$3650.00
Replique 5 Selective Partition *HDP512*	$395.00
Replique 5 OmniPrint *HDP513*	$395.00
Replique 5 NTFS Clever Copy *HDP514*	$395.00
Replique 5 OmniDiagnose *HDP515*	$395.00
Replique 5 Clone Pack (includes all options and carrying case) *HDP516*	$1249.00
Replique 5 Extended Warranty (2 Years Total) *HDP533*	$695.00
Replique 5 Case (Requires purchase of 2 cases) *HDP536*	$198.90

OMNICLONE REPLIQUE 10

Replique 10 Selective Partition *HDP517*	$545.00
Replique 10 NTFS Clever Copy *HDP519*	$545.00
Replique 10 OmniDiagnose *HDP520*	$545.00
Replique 10 MasterManager *HDP543*	$545.00
Replique 10 Clone Pack (includes all options) *HDP521*	$1635.00

OMNICLONE REPLIQUE 15

Replique 15 (3 Master / 15 Target) metal case and heavy-duty, ball bearing slides *HDP505*	$9595.00
Replique 15 Selective Partition *HDP545*	$695.00
Replique 15 NTFS Clever Copy *HDP546*	$695.00
Replique 15 OmniDiagnose *HDP547*	$695.00
Replique 15 MasterManager *HDP544*	$695.00
Replique 15 Clone Pack (includes all options) *HDP548*	$2085.00
Replique 15 IDE and Power Cables (18 x 5" Sets) *HDP558*	$399.95
Replique 10 Docking Station *HDP537*	$849.95

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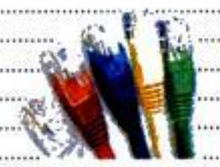

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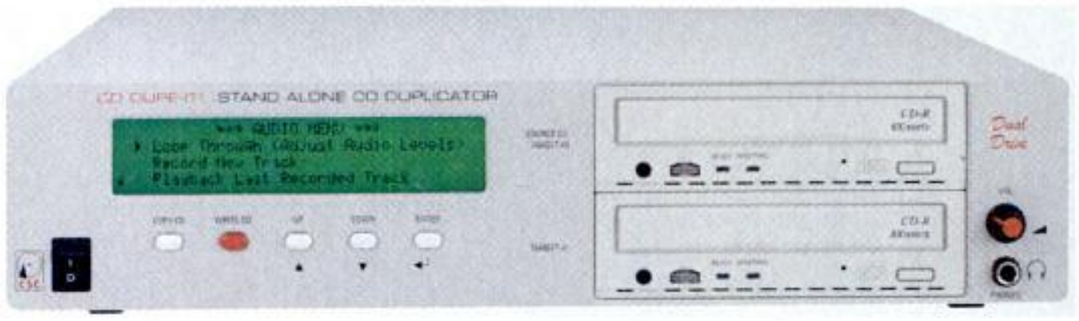

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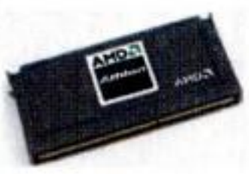

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The Daily Glitch

by Jon Phillips

Apex of Accuracy, Paragon of Truth ★ Monday, Sept. 4, 2000

Software Developer Uses Stealth, Cunning, and Treachery to Win 'Survivor' Challenge

Enduring malnutrition, stifling heat, and the full complement of Tribal Council extradition votes, William Gates, a Redmond, WA software developer, has won CBS Television's "Survivor" challenge. The bespectacled computer enthusiast leaves his remote island encampment with a check for $1 million, a sum he intends to toss on top of his dresser and forget about until he needs small change on laundry day.

To take home the grand prize, the show's winner must survive periodic votes in which each competitor casts a ballot to extradite a fellow islander. While past "Survivor" winners have relied on diplomacy and a cooperative work ethic to gain the support of their fellow islanders, "Bill," as TV audiences have come to know him, achieved success with cunning and treachery.

Edgar was voted off the South Pacific archipelago after Bill implicated him in the mysterious disappearance of some coveted twine. J.C. was voted off after Bill convinced the other islanders that J.C. was possessed by the malevolent spirit of Benito Mussolini. And in an unprecedented turn of events, Bill surreptitiously blew out Mayumi's "torch of life" during a Tribal Council Meeting, forcing show host Jeff Probst to oust Mayumi in response to what he called an "act of God." Never before in the history of the TV show have two competitors been ousted during one meeting of the Tribal Council.

All in all, Bill ducked and parried his way through the 39-day ordeal, skillfully manipulating his competitors, and seeding their collective subconscious with fear and suspicion. In fact, Bill found his only significant challenge in Scott McNealy, a Palo Alto, CA coffee importer.

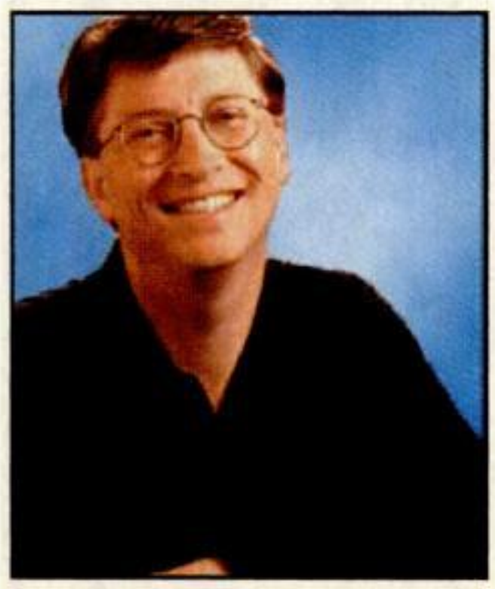
Fervently independent and stubborn as a mule, Scott refused to submit to Bill's aggressive manipulation. This lead to conflict, which came to a head when the two wrestled over intellectual property rights to the "coconut cell phone."

Bill said the coconut cell phone was based on his own proprietary technology. Scott countered by accusing Bill of both design theft and conspiracy to monopolize the island's telecommunications trades. As the two tribal members broke into a scuffle, the coconut cell phone flew from one of their hands, plopped into the lagoon, and rode a rouge rip tide into the open sea.

None of the other islanders had the heart to tell the South Seas entrepreneurs that the coconut cell phone was in fact just a half-eaten, bug-infested coconut, and not a functioning communications device. The issue quickly became moot, however. Three days after the scuffle, Scott was voted off by a small allegiance of islanders who had been granted stock appreciation rights in Bill's budding beetle larvae cannery.

The season finale of "Survivor" can be seen at 8 P.M. this Wednesday, on its new network, MSNBC. ✹

Name: William Henry Gates III
Age: 45
Marital Status: married
Occupation: software developer
Home Town: Redmond, WA
Quote: "I am amused by the simplicity of this game. Bring me a plate of your finest meats and cheeses!"
Luxury Item: *Lord of the Flies*, unabridged edition
Activities he missed the most: Updating his home page; multiplayer *Quake III* sessions with Billy Jingles and the Rodriguez brothers.



Comfort item he missed most: Orville Redenbacher's Barbecue Flavored Popcorn Cakes

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